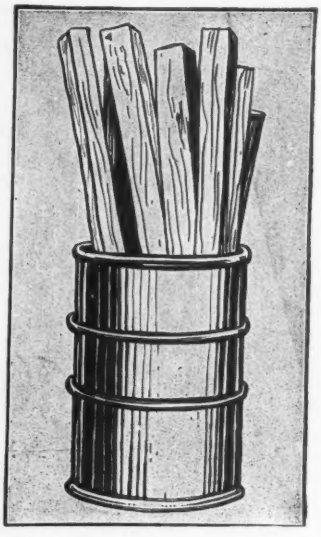
American Forestry

Vol. 22 JULY, 1916 No. 271



THE WHITE PINE



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AMERICAN FORESTRY

The Magazine of the American Forestry Association

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AMERICAN FORESTRY is published monthly by the American Forestry Association. Subscription price, three dollars per year; single copies, twenty-five cents

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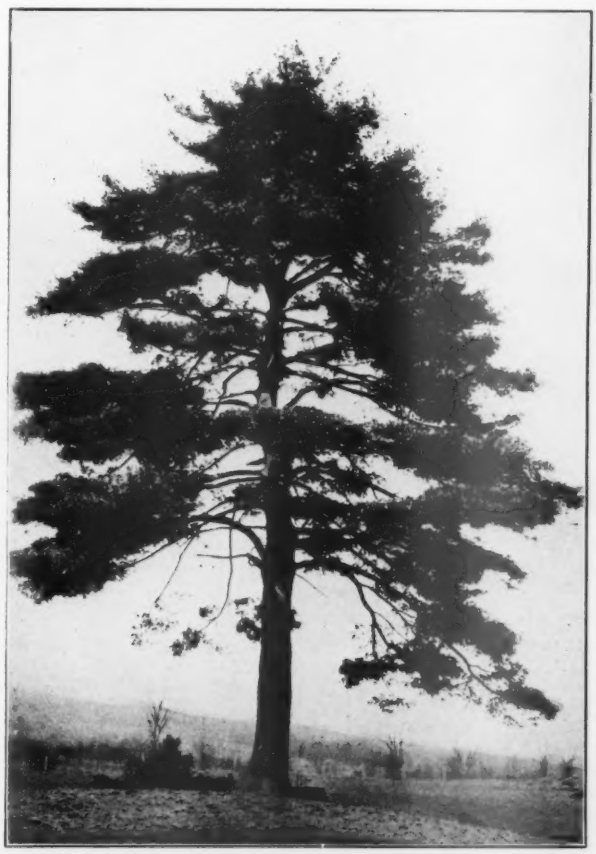
The White Pine

Identification and Characteristics

By Samuel B. Detwiler

THE white pine is the monarch of the eastern forests, "in lordly right predominant o'er all." No other tree has been so important to the commercial development of America, and in beauty, stateliness, and individuality of form it is rivalled but not surpassed. When the Pilgrims landed on the cold and cheerless Plymouth shore, the pine was the only green thing to greet them, and it became their emblem on the historic "pine tree shilling" and other coinage. As the forests retreated before the axe, southeastern Maine became renowned for its "pumpkin pine" and Maine is still called in recognition of the white pine growth the Pine Tree State.

In the song and story of the lumberjack and river driver, white pine holds the most honored place. The history of the lumbering of white pine until 1890 is also practically the history of the lumber industry in America up to that time. The first house built in America of which there is authentic record, was constructed of white pine. In 1890 white pine lumber formed nearly one-third of the yearly output of lumber; ten years later more than one-fifth of the lumber used in the United States was still white pine, but in recent years it has constituted less than one-tenth of the annual cut. Although most of the magnificent virgin white pines have given their lives that we might thrive, an abundant second growth has taken their place wherever forest fires have been controlled, and with proper care this will provide a continuous though diminished supply of this most typical American wood.



SECOND GROWTH WHITE PINE

White pine is undoubtedly the most popular of all the forest trees for planting. Millions of White pine seedlings are now growing at nurseries and millions will be planted in the future.

White pine is native from Newfoundland and the northern shore of the Gulf of St. Lawrence to southern Manitoba. It ranges southward through the region of the Great Lakes to northern Illinois, northern and eastern Ohio, Pennsylvania, and along the Allegheny Mountains to northern Georgia. The most perfect development of white pine was in New England, New York and Pennsylvania. When this supply was exhausted the lumberman moved on to Michigan, Wisconsin and Minnesota. At the present time, Minnesota produces more white pine lumber than any other state, Minnesota and Wisconsin together furnishing about one-half of the annual cut.

White pine grows straight as the masts for which it has so well served, sometimes to a height of more than 200 feet. Thousands of acres of blackened stumps, many of them 4 to 5 feet across their tops, are all that remain of once splendid white pines. One early writer states that in 1736 in Dunstable, N. H., a white pine tree was cut which had a diameter of 7 feet 8 inches. Another New Hampshire tree felled 150 years ago measured 274 feet in height. One account mentions the white pines found in New England as being "frequently 6 feet in diameter and 250 feet in height." Most of the trees of this species that are cut by the lumberman of today are less than 3 feet in diameter and 125

feet in height, but some large ones are still found.

Free-growing white pine trees have live branches to the ground and the trunk is short, tapers rapidly and not infrequently it divides into two or more parts. In the forest the stems have little taper and are without side branches for 25 to 75 feet above the ground. The branches spread horizontally and in old age the tops are irregular and picturesquely flattened and tufted with foliage. This feature of the tree is so characteristic that an old tree may be recognized by its general appearance almost as far as it can be seen. Thoreau greatly admired the white pines and wrote: "Their flattened boughs rest stratum on stratum like a cloud, a green mackerel sky,—all branches distinct like the frond of a fern." The bark on branches and young trunks is thin, smooth and greenish, but soon turns light brown and is later dark and scaly. Large trunks have thick, dark gray bark, with broad scaly ridges separated by shallow furrows.

Like all pines, the leaves are needle-like and borne in clusters. The white pine is easily told from other native pines in the region in which it grows because its needles are always in groups of five. Young leaves are pale green and the clusters are surrounded at the base by a paper-like sheath. When the leaves mature this sheath falls away and the leaves in each group stand apart giving to the foliage a tasseled, feathery appearance which is more pronounced because the needles are so soft and flexible. The full grown leaves are from 2½ to 5 inches long, bluish green in color, with a beautiful, silvery sheen on one surface. When the leaves are stirred by a breeze, the light color of the leaves is very noticeable, and makes it apparent why this tree bears the scientific name of *Pinus Strobus*. The leaves are triangular in cross section and the edges are notched with tiny saw teeth. When the five needles in a cluster are pressed together, it will be seen that the edges join to form a cylinder. The leaves die and fall in September of their second season or in June of their third year.



From "Pennsylvania Trees"

WHITE PINE

1. Branch with needles and terminal cluster of buds
2. A cluster of five needles, one-half life size
3. Tip of White pine needle, enlarged
4. Branch with staminate flowers
5. Branch with (*a*) pistillate flowers on new growth and (*b*) one-year-old cone on last year's growth
6. Branch with open and closed cone
7. Lower side of a cone scale
8. Upper side of a cone scale with two winged seeds
9. A winged seed, one-half life size
10. A seed, natural size
11. Section of seed with embryo, natural size
12. A seedling one-half life size

In May, when the new growth begins, the flowers of the white pine appear. The pollen - producing flowers are yellowish, egg-shaped bodies about one-third of an inch long, clustered at the base of the new growth. When ripe, they shed the bright yellow pollen very abundantly and it is carried long distances by the wind. Each minute pollen grain is provided with two air sacs that convert it into a microscopic balloon. The seed producing flowers are borne singly or several together on the upper branches of the trees. At first they are slender, upright, rose-colored cones about one-fourth of an

inch long. By autumn they are about an inch long, with a purplish color. The next spring the cones turn green and their increasing weight causes them to hang downward, incurving toward the branch. By July of the second season the cones are fully grown, usually from three to six inches long, sometimes ten inches. In addition to being slender the ripened cone is known by its light brown color and its smooth rounded scales, entirely free from spines at their tips. Except for a few sterile scales at the base and tip of the cone, each scale bears two brown, winged seeds. Most of the seeds are scattered during September and October as the cones open, but all through the winter old Boreas continues to whirl them over the snow. Many of the seeds are carried to a distance equal to twice the height of the mother tree, and some travel considerably farther. The cones drop from the tree after they have shed their seed. Some cones fall before this is accomplished,



WHITE PINE GROWN IN THE OPEN

This is a typical White pine growing at Raquette Lake in the Adirondack Mountains. The photograph is from a collection owned by the American Museum of Natural History and was taken by Ernest F. Keller.

for White pine seeds are greatly relished by the squirrels for winter food, and early in September they begin to cut large quantities of the cones from the trees and bury them in big or little piles, for future use. Although some cones are produced every year, it is usual for heavy crops to be borne every three to five years.

Gathering White pine seed for planting or for sowing in nursery beds is an established business. A bushel measure will hold about 1,000 cones and yield about a pound of clean seed containing more than 30,000 separate seeds. In a good seed year, a single large tree will yield from two to five or more bushels of cones. The seeds germinate best in mineral soil and ordinarily from 10 to 20 per cent fail to start growth. If the accumulation of needles under the seed trees is very great the young seedlings are apt to die before the roots reach the mineral soil from which they obtain their nourishment.

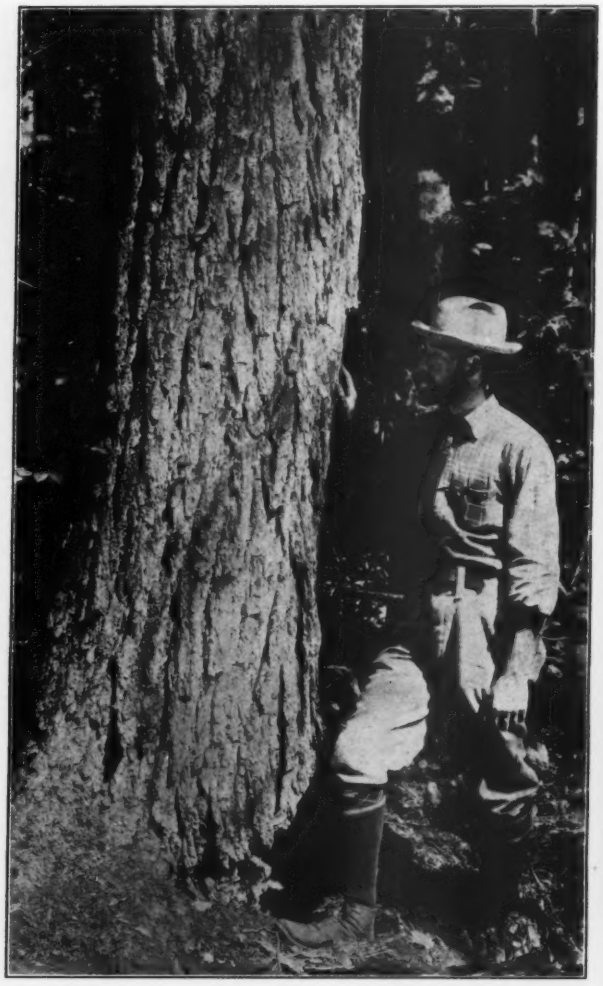


THE AREA OF WHITE PINE GROWTH

Late in the spring the tiny seedlings may be seen pushing upward the old seed shell that binds the ends of the ten baby leaves into a spindle-shaped cluster. The tips of these leaves remain imbedded in the food stored up in the seed shell until all of the nourishment is absorbed. Then the shell is thrown off and the young leaves proudly spread out into a tiny ten-pointed star, at the center of which is the bud which unfolds year after year and carries the stem upward, straight as an arrow. Surrounding this central bud are other buds, usually five in number, from which five branches start when the growth of each year begins. For this reason, each successive year's progress is plainly marked by a whorl of branches, and since the main stem of the tree between the nodes is generally free from branches, it is very easy to determine how many years a young pine has required for its growth by simply counting the number of whorls. White pine seedlings that come up in dense shade under older trees will live for a number of years, but without making much growth. If the over-shadowing trees are suddenly removed and the seedlings exposed to full, intense sunlight, most of them die before they can become accustomed to the new conditions. If the larger trees are removed so as to gradually admit the air and sunlight, the young seedlings readily adapt themselves to the change and eventually grow into vigorous trees.

The bark of a young White pine is so thin and tender that even a very light fire produces sufficient heat to kill it. One of the greatest losses by forest fires is caused by the death of these little trees which so many do not see, or at least believe to be only valueless "brush." True, little pinelets struggle with each other and with other kinds of trees for moisture from the soil and for the space

to spread their ever-widening crowns, and many die in the battle. But those that survive are the finest and best specimens of their kind, and this is nature's way of developing the straight, clean stems that produce the even-grained, knotless lumber that has given white pine fame throughout the civilized world.



BARK OF THE WHITE PINE

On old trees the bark is thick, dark, gray and divided by long and shallow fissures into broad longitudinal ridges; on young trees it is thin, smooth and greenish-brown, later growing scaly and darker.

It is not unlikely that some of the white pines still standing in our forest were saplings when Columbus discovered America. There is a record of a tree in Pennsylvania, 42 inches in diameter at 4½ feet above the ground, with a total height of 155 feet, that was 351 years old and scaled 3,335 feet. Several fair sized areas of virgin White pine forest are still to be found in Warren and Forest Counties, Pennsylvania. Those who admire the White pine will find it well worth while to make a pilgrimage to these tracts just for the pleasure of standing on the soft brown carpet of resin-scented pine tags and listening to the sound of the sea as the wind sways the tops of "the murmuring pines and the hemlocks," nearly 200 feet above ground.

The wood of White pine is resinous, light in weight, compact, straight-grained and even of texture, soft and easily worked, but only moderately strong. It does not warp, shrink or check, and has been used for practically every purpose for which wood is adapted. Large trees have a thin ring of sapwood. When first cut there is little difference in color between heart and sap, but the crystal-clear drops of resin that ooze from the sapwood as soon as it is cut plainly distinguish it from heartwood. After being exposed to the air the heartwood changes to a light reddish-brown color. The great usefulness of



INTERIOR VIEW OF PLANTATION

Showing the regularity of planting and growth in trees which are now fifty-five years old. It is estimated that the net profit of this white pine if cut now would be at the rate of $140.25 an acre.

White pine is due largely to the ease with which the woodworker can fit it to his requirements, its almost complete freedom from shrinking or swelling, its strength in proportion to its weight, and its durability when exposed to the weather. It is not especially durable in contact with the soil.

White pine prefers fertile, well-drained soil, but grows satisfactorily in all but the driest sands or very swampy lands. Its most common associate is the hemlock, but it also grows with other conifers and with the northern hardwoods. Forests composed almost entirely of white pine occur under natural conditions and it thrives when planted alone or mixed with other species. It is the most important tree for reforesting waste lands in the northeastern United States, and of late years thousands of acres have been planted with it, mostly by private owners. Its rate of growth is rapid and evenly maintained. In 35 years White pine trees in a fully stocked plantation will reach forty to fifty feet in height and yield from 10,000 feet to 30,000 feet B. M., depending on conditions of growth and the closeness with which the trees can be utilized. A White pine plantation in Connecticut, 31 years after planting, had an estimated yield of 15,000 feet B. M. per acre, on poor soil. In the same state, a 50-year old plantation, on medium soil, yielded 41,000 feet B .M. per acre. In 75 years, a plantation on poor soil, also in Connecticut, gave a yield of 60,000 feet B. M. In the first example the value of the stumpage was estimated to be $75 per acre, in the second instance, $292 per acre, and in the third $422 per acre. As an ornamental tree the White pine is highly prized because of its silvery, feathery foliage, its symmetrical growth in youth, and its dignity and character in old age. It is extensively planted, not only in its native region, but in distant States, and in Europe it has been recognized as one of the most valuable American trees, both for ornamental and commercial planting.

The White pine appears to have more than its fair share of enemies. In early life grazing cattle and forest fires are destructive. In the Eastern States, the White pine weevil attacks the leading shoots of saplings and kills the tips; usually a side branch turns upward to continue growth, but this causes a bad crook in the trunk, and if the tree is attacked several times, it is permanently deformed. The gypsy moth defoliates and kills White pine trees at times, and another imported insect enemy, the leopard moth, will become highly destructive to it if it is not controlled. Several other insects, such as the cottony scale, also injure it, as well as a root disease which may be related in some way to the nodules (mycorhiza) commonly found on the rootlets. The White pine needle blight does not appear to be so detrimental as was feared several years ago.

None of these troubles compare in seriousness with the White pine blister rust, which threatens to become as destructive to the White pines of the United States, both the eastern species and those in the mountains of the West, as the chestnut blight has been to the chestnut trees. The blister rust was brought to the United States from Europe some years ago on nursery stock, and in spite of the efforts made by the National and State officials to prevent this disease from gaining a foothold in this country, new outbreaks have been found each year. The disease has been spread most widely in Massachusetts because of the extensive planting of White pine in that State, but it is also present in Vermont, New Hampshire, Connecticut, New York and Pennsylvania, and a few infections have recently been discovered as far west as Wisconsin and Minnesota.

Efforts to control the blister rust are being made by the various States concerned, in cooperation with the United States Department of Agriculture. The successful outcome of this endeavor depends largely on the interest shown by White pine owners and others in locating infections and in applying the proper measures to prevent the further spread of the disease. It is to be hoped that Byron had not the gift of prophecy when he wrote:

"These blasted pines,
Wrecks of a single winter, barkless, branchless,
A blighted trunk upon a cursed root."

Commercial Uses of White Pine

OTHER American timber-producing trees have a wider range than white pine, but it is not believed that any have yielded, in the aggregate, a larger amount of lumber. One reason for the important position held by white pine lumber for nearly three centuries is the fact that it grew in great abundance and perfection in the region where the settlement and commercial development of America began. The wood is light and resinous, the logs can be floated long distances, and the finest white pine forests existed on the headwaters of all the principal rivers from Maine to Minnesota.

White pine forests originally covered about 350,000 square miles of territory in the United States, and it seems probable that this area has furnished nearly five hundred thousand million feet, b. m., of white pine lumber since 1623, the year that sawmills in New York first began to manufacture it. In 1635, a cargo of white pine masts was shipped to England from Plymouth, Massachusetts. From this beginning a profitable and extensive foreign trade has developed in "Weymouth pine," as the white pine is known abroad. In the early days, white pine lumber also went from New England to Africa and was paid for in slaves that were sold in Virginia and the West Indies. Because of limited knowledge of the extent of the American wilderness, it was predicted in Massachusetts as early as 1650 that the supply of white pine would soon be exhausted, but in 1700 white pine planks 36 inches wide and 36 feet long were easily procured for the decks of vessels. In 1706 it is known that 70 sawmills were operating on the Piscataqua River, and this was the center of the white pine industry of that period. These mills had only old-fashioned, up-and-down sash-

saws, operated by water power. Each mill could cut only 1,000 to 3,000 feet, b. m., of lumber, and it would have required five times as many of these sawmills to produce the million feet, b. m., that a single Minnesota sawmill has been credited with being capable of turning out daily.



Photograph by "Pine Cone," Minneapolis, Minn.

SPRINGTIME ON A MINNESOTA RIVER

Logs of the winter's cut are waiting for the floods to carry them into the boom some scores of miles down stream. These smooth pine logs will lose much of their bark during the jams and the bumps of the drive, but the wood will not be injured and such is the material of which high grade lumber is made. On the rising ground back of the river shore, the view shows a fine forest of white pine, apparently without a tree gone. Their turn will come next winter.

Through the Louisiana purchase in 1803, a profitable lumber market was opened in New Orleans. This market was supplied by rafts of white pine logs floated down the Ohio and Mississippi rivers from Western Pennsylvania and New York. Some white pine was cut in Michigan and Wisconsin prior to 1830, but it was not until ten years later that lumbering began in earnest in these States. It was not until about 1875 that white pine logs were cut in Minnesota. In Minnesota and Wisconsin white pine was cut on the streams tributary to the Mississippi, and floated to St. Louis and other fast-growing river towns, to be turned into lumber, demanded by the rapidly settling prairie region. A little later, the logs were rafted on the Upper Mississippi River and towed to the mills below. In the "old Beef Slough days" 13,00,000 feet of white pine logs were rafted in a single day. In a few years sawmills were established nearer the source of the logs and more recently, railroad transportation, because of the high stumpage value of white pine and the inaccessibility of the remaining timber, was found to be cheaper than water transportation. Thus was lost most of the romance which formerly surrounded the progress of white pine logs from the forest to the mill. The old-time "lumberjack" is passing; here and there are still to be found the men that cut and banked the white pine logs all winter, and followed "the drive" in the spring. They loved the pine woods, and as the years went by, they followed the virgin white pine westward from Maine to New York, Pennsylvania, Michigan, Wisconsin and finally to Minnesota. Never has there been a happier, truer-hearted or more whimsical company in our industrial army. With a creed and a code all his own, the lumberjack of the white pine camp was a product of his environment, and, like the buffalo, the Indian and the white pine, he belongs principally to the "old days."



SQUARES FOR WINDOW SHADE ROLLERS

More than 60,000,000 feet of white pine are annually made into shade and map rollers in the United States. This wood is unsurpassed for that purpose, because of its lightness and its disinclination to warp. High grades only are used.

The chronicle of white pine lumbering is the familiar history of wasteful methods in days of plenty, with the sequel of efficient utilization forced through increased demand in the face of diminishing supplies. Perhaps one-third of the possible cut of white pine lumber was lost through logs left to rot in the woods because it was not profitable to saw any but the clearest and

soundest. Fire that was carelessly permitted to burn in the slash left after lumbering, destroyed an unbelievable amount, without doubt, at least, another third. Today white pine is worth $15 or more per thousand feet on the stump and the greatest care is exercised in preventing waste.

The progress in lumbering white pine is graphically illustrated by a lumber operation in Western Pennsylvania. About sixty years ago this lumberman began cutting white pine in the virgin forests, floating the logs to Pittsburgh to be sawed. Following the methods of his grandfather and father, who had logged white pine in Maine and Eastern Pennsylvania, he at first cut no trees under two feet in diameter. The stumps were four to six feet high, and no logs were cut from the trunk above the first limb; also, it was usual to "butt" the first logs;



STACKS OF WHITE PINE FOR EXPORT

Here is shown some of Minnesota's best product. This grade often called "cork" pine and corresponds to the "pumpkin" pine once abundant in New England. It dries as straight as an arrow. Pattern makers want this kind.

that is, a section 10 or 12 feet long was sawed off the lower end of the first log and left to decay in the woods. This was done because some of these logs were more or less affected by wind-shape and did not furnish the absolutely perfect lumber demanded by the trade of that day. It was not long before the young lumberman worked out a plan to make a profit from some of this waste material. From the butt logs and high stumps he made split shingles, loaded them on a raft of logs and sold them in Cincinnati for a dollar more per thousand than the regular market price. Thus encouraged, when he built a sawmill on the tract he installed the first lath



NEARLY OUT OF BUSINESS

The refuse burners at the big white pine mills no longer consume much material. Slabs are worked into lath, molding and other small artciles, the sawdust goes to stables as horse bedding the chips and splinters are loaded in cars to be hauled to the towns for fuel, and very little finds its way to the waste heap. The picture represents a scene at the mill of the Northern Lumber Company, at Cloquet, Michigan.

mill in Western Pennsylvania and manufactured laths from the white pine slabs that others burned, and was ridiculed for his economy. However, the lath mill produced a profit, and it was not long before other manufacturers followed his example.

This pioneer in conservative lumbering has continued to apply new methods of manufacturing profitable by-products from waste; his mill has no need for a slab-burner as there is not sufficient waste to supply all the fuel needed to furnish power for the plant. In the woods, low stumps are made, and all of the tree that can be saved is taken to the mill. The tops are cut into cordwood and sold to the paper pulp manufacturers; the brush is piled and burned, and should a forest fire be

started in spite of the woods patrol, all employes are immediately called out to extinguish the blaze. Trees thrown by wind or injured by insects or disease are removed as soon as possible so that their full usefulness is obtained and the health of the forest is protected. As a result of this policy, there remains a profitable stand of virgin timber and second growth, sufficient to supply the mill for years to come. A prosperous village has grown up around the sawmill that has operated in one spot for half a century, with a good school, church, stores, pleasant homes and shady streets. It is fitting that the name of this town is Endeavor, and Mr. N. P. Wheeler, the founder, may well take pride.

The rise in the price of white pine stumpage is well shown by the history of a tract of 500,000 acres of white pine timber in Wisconsin. This area was purchased in 1866 by Ezra Cornell, at a price of 60 cents per acre, or less than 10 cents per thousand board feet. A portion of the tract was sold in 1873 for $4 per acre or about 30 or 40 cents per thousand feet of standing timber. By 1905 practically all of the land was sold and a profit of five and one-half million dollars was realized. Some of this white pine timber brought $10 and $12 per thousand feet on the stump, and present prices of stumpage may exceed $20 per thousand feet if the timber is of exceptional quality and well located. This rapid rise in stumpage value has opened the door to the application of the principles of intensive forest management in producing future crops of white pine lumber. This is especially noticeable in New England, where great interest has developed in planting white pine and in giving proper care to second-growth white pine forests.

The uses of white pine are so diversified that several pages could be filled with the mere enumeration of them. In the day of wooden ships, white pine was highly important for masts, spars, figureheads and decking. Boats of all kinds are constructed of it, and in early times canoes were frequently fashioned from white pine logs. Floating docks made of white pine logs or timbers serve their purpose perfectly, decades after other kinds of wood have become water-logged. Bridges, aqueducts and structures of a like nature were formerly built entirely of white pine timbers, where they were not required to bear excessive strains. Many of the old covered bridges of Pennsylvania and West Virginia were built of white pine timbers, enclosed with white pine siding and covered with white pine shingles. So durable have these bridges been that it was said of some of them that "no man had lived long enough to both witness their building and their failure through decay."

White pine has always been the wood of universal excellence for constructing houses, barns, sheds and other buildings. Early in 1800 Michaux estimated that, aside from the cities, there were half a million houses in the United States that were built of white pine wood. New York and the New England States abound with splendid examples of beautiful colonial houses constructed of white pine, that have stood for more than a century, or even more than two centuries, testimonials to the wisdom of the early builders in selecting white pine in preference to other materials equally available. Not long ago, ten white pine beams were removed from a building in New York City after doing service for fifty years. These beams were 18 inches thick, 2 feet wide and 50 feet long, free from knots or defects and perfectly sound after a period equal to an ordinary lifetime. Some of the beams are now being used as temporary supports in the New York subway excavations, in a position where their light weight, strength and length, give them superiority over metal or other kinds of wood.

White pine is unequalled as a wood for lath, siding, light dimension, sash, doors, blinds, planing mill products and general mill work. White pine shingles are of high order of merit; where it is not subject to heavy wear, it makes a serviceable flooring. Porch columns, pumps, patterns, picture frames and penholders are all made of white pine, because the wood is less affected by moisture than other woods, neither shrinks, checks nor warps, holds paint and gilt finish well, and its soft, even grain, makes it an easy wood to work with any kind of tools.

Moulding, ceiling, panels, shelves, caskets, baskets, wooden ware, refrigerators, toys, trunks, tubs, shade rollers and skewers are a few of the common uses of white pine. On the farm and in the home, the shop and the factory, this wood has uses galore. Fences, wagon beds, parts of vehicles and machines, wheelbarrows, windmills, handles, beehives, chests and shelves are a few of these. A fine, old, white pine chest made of beautifully clear, wide lumber may be seen by visitors to Longfellow's old home in Portland, Maine.

For a period of 200 years large quantities of white pine were used for such articles of furniture as bookcases, cupboards, counter tops and tables, desks, benches, stools and chairs. While not well adapted to all of these uses, it served its purpose, and for drawing tables and drawing boards it has no equal. It is also one of the best woods for all kinds of boxes and crates, except for the heaviest shipping, because it combines fair strength with light weight, and its light, even color and the smooth surface of the planed wood makes printing show to advantage. Much white pine is manufactured into fish and lard buckets, pails, washtubs, churns, ice cream freezers, spice containers, etc.; it is also a high-class wood for tanks and silos and barrel headings. Logs of white pine were formerly used for wooden water pipes, for which they served better than most woods. Excelsior and match sticks are two other commodities in which white pine is preferred above other woods.

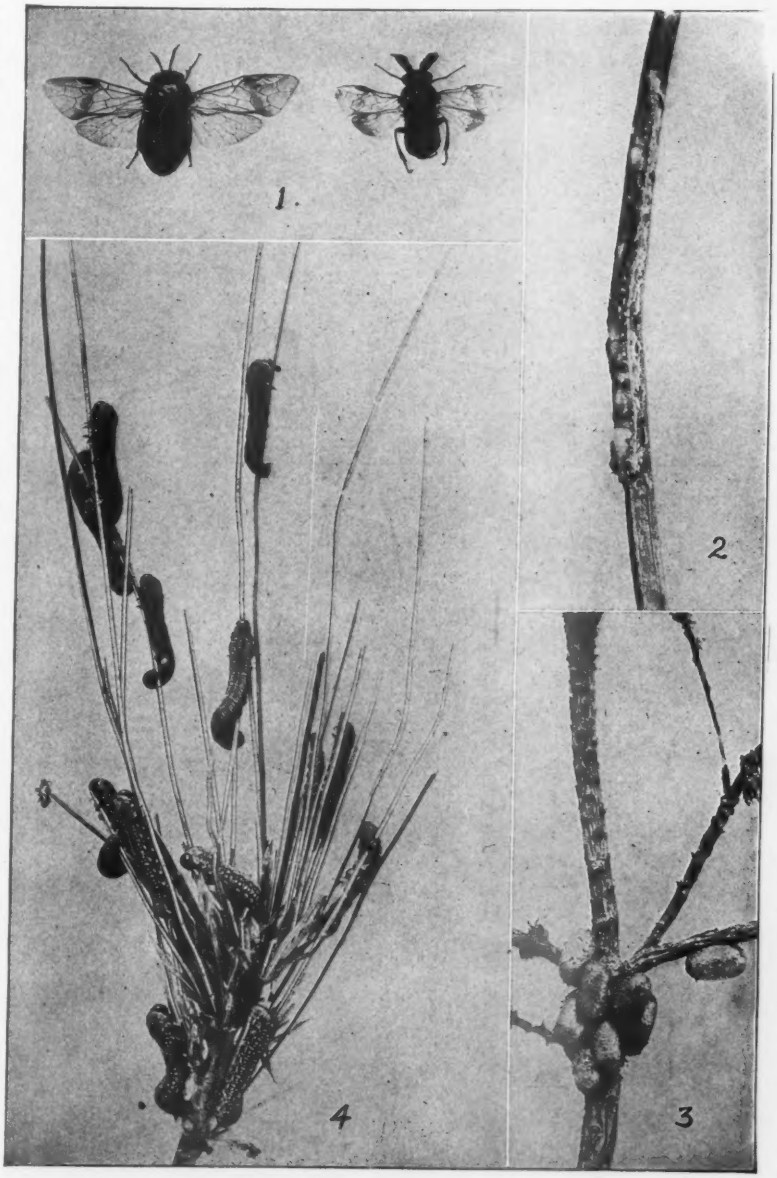
Western white pine (*Pinus monticola*) and sugar pine (*Pinus lambertiana*) are five needled pines with wood very similar in appearance to that of the eastern white pine (*Pinus strobus*). In fact, the qualities of the two western woods are so nearly like those of white pine that they may be substituted for the eastern species for most purposes.

Another Insect Enemy of the White Pine

By P. L. Buttrick

THE white pine is the most important timber tree in eastern North America and has long been a favorite tree for planting purposes, both commercial and ornamental. Hundreds of acres are each year planted to it in the expectation that they will in from 40 to 60 years bring in a considerable revenue from the sale of their timber. As an ornamental tree—whether in small or large sizes—it needs no introduction.

Some fifteen years ago when white pine planting operations on a commercial scale were first undertaken it was thought that the tree in its earlier stages had almost no enemies; however, it has been acquiring them ever since. First the white pine weevil (*Pisodes strobi*) started its depredations. This insect, like the poor, has apparently always been with us, but unlike the poor, has only recently become abundant. The weevil damages young pine plantations by boring into the leading shoot and killing it. Foresters and entomologists working together have devised means of holding this insect in check by cutting out the infested shoots and collecting the adults in nets before they dig into the shoots. As the trees get older they become immune to the pine weevil. The weevil problem largely disposed of, along came the white pine blister rust—an undesirable alien from Europe brought in on importations of white pine nursery stock. This disease attacks white pine and currents or gooseberries at different stages of its growth. If the two are permitted to grow close together the rust will severely damage or kill the young pines. Although all importations of white pine from Europe have been stopped the disease has spread to some extent in this country and the Federal Government and some of the States are busy fighting it. It is thought that by prompt action its further spread can be prevented.



THE DESTRUCTIVE PINE SAWFLY

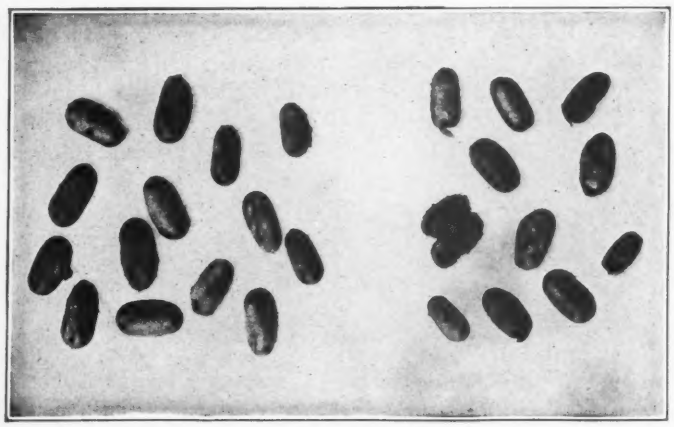
1. The adults, which, following the white pine blister rust, are now attacking pines in Connecticut and doing considerable damage.
2. The eggs of the pine sawfly in a pine needle about four times enlarged.
3. The cocoons—natural size
4 The larvae feeding on pine—natural size.

The latest addition to the ranks of the enemies of the white pine has been recently studied and reported upon by Dr. W. E. Britton, the State Entomologist of Connecticut, who first discovered it in this country.

The pest is an insect known as the pine sawfly (*Diprion simile*: Hartig). While the white pine weevil attacks the leading shoot of the tree and the

blister rust kills the bark, the sawfly eats the leaves. Like the blister rust, the sawfly is an alien—undesirable, of course. It was probably introduced on nursery stock before the institution of the rigid inspection requirements, and is thought to have only recently been introduced into this country.

The larvae of the insect is about an inch long, of green-

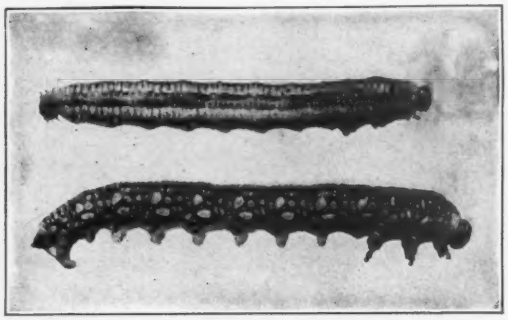


NATURAL SIZE OF THE PINE SAWFLY COCOONS

The cocoons on the left have been torn open probably by birds, those on the right show exit holes of the chalcid parasite.

ish-yellow color, has a black head, a brown stripe down its back, and a yellow stripe with brown markings on it on each side of the body. The adult is a small wasp-like insect with a wing spread of about an inch. The cocoon is formed among the leaves and branches or falls to the ground beneath it. The cocoon is about three-eighths of an inch long and brownish in color.

The adults emerge from their cocoons late in April or early in May. There are two, rarely three, broods. The larvae feed during May and June for the first brood and during August and and September for the second.



TWO VIEWS OF THE LARVAE

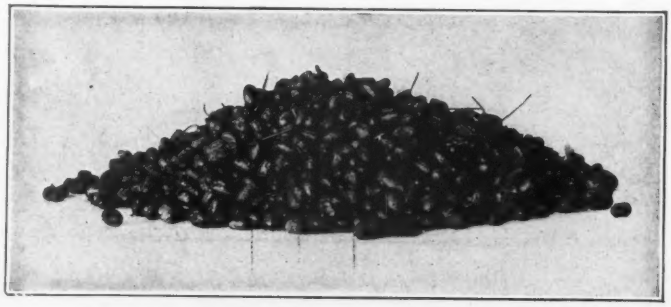
The dorsal and the lateral views of the larvae of the pine sawfly, twice enlarged.

The larvae feed on the needles of the pines—particularly seedlings, often entirely defoliating them. In Europe the insect has several times caused serious damage in its outbreaks. There it attacks mature trees as well as seedlings and young trees. These outbreaks have occurred in the pine forests of southwestern Russia, in Sweden, Prussia and France. In England its attacks upon Scotch fir have occasionally been serious. In Connecticut it has already been found on the following species of pines:

White pine (*Pinus strobus*), limber pine (*Pinus flexilis*), Scotch pine (*P. sylvestris*), Japanese or Botan pine (*P. excelsa*), Japanese red pine (*P. densiflora*), Korean pine (*P. Koraiensis*), *Austrian pine* (*P. Austrica*), Cembrian pine (*P. cembra*), Mugho pine (*P. montana*).

Only the first two are native forest trees, yet there is no reason to suppose that it would not occur on all our native pines as well as those of Europe and Asia. It might also occur on other conifers as well as pines in this country as it does to some extent in Europe. For the present at least it will doubtless do more damage to white pine than any of the others, since it is the most common and important pine in the region where the insect has become established.

So far the insect has been found in this country only in Connecticut, but seems to be well distributed over the State, and is doubtless present outside of it, possibly wherever imported pine



A PILE OF COCOONS

These cocoons of the pine sawfly were collected from pine twigs. There are 1,617 cocoons in this heap.

stock has been planted, and much has been planted.

Dr. Britton finds that when the pine sawfly is present in nurseries or on small ornamental trees, spraying with lead arsenate when the larvae are active is a good remedy. As some of the cocoons fall to the ground it is desirable to rake up the leaves and litter beneath the trees and destroy it. All nursery stock should be carefully inspected and cocoons removed to prevent the spread of the pest.

Whether this pest will prove serious, or whether, like the pine weevil, we will be able, by a little care at the proper time, to keep it in check remains to be seen. It is certainly too early to discourage the planting of white pine because of it, but nurserymen, foresters and all pine plantation owners should keep a sharp watch for the insect and take prompt action to exterminate it wherever it appears.

Glacier National Park

By Mark Daniels

Former Superintendent of National Parks.

GLACIER is the only park in our system of National Parks which is purely Alpine in character, and its forests seem to justify the contention on the part of those who live in Montana that Glacier National Park put the pine in Alpine. It is situated in the northwestern corner of Montana and is traversed in a northerly and southerly direction by the main crest of the Rocky Mountains. The continuation of this range into British Columbia constitutes the Canadian Rockies and the scenic area in the vicinity of Banf which has been set aside by the Dominion Government as a Canadian national park. It might incidentally be added that this same Canadian Government Park has received an appropriation several times larger than that which has been set aside by the United States Government. As a result, the number of citizens of the United States who are familiar with the beauties of the Canadian Rockies in the vicinity of Lake Louise and Banf far outnumber those who know of the equal beauties of Glacier.

The area now within the boundaries of Glacier National Park was at one time possessed by the Blackfeet Indians and was part of their reservation, the remaining portion of which is contiguous to the Park on the eastern border. The Park, of course, is not the only thing which the Government has taken from the Indians. However, the little game of "robbing the Indians" is not properly part of the subject matter of an article on National Parks, even though the discussion of its fascinating phases might be justified in view of the fact that, properly administered and developed, this particular holding, which was once part of the Blackfeet Indian Reservation, might be put to a more utilitarian

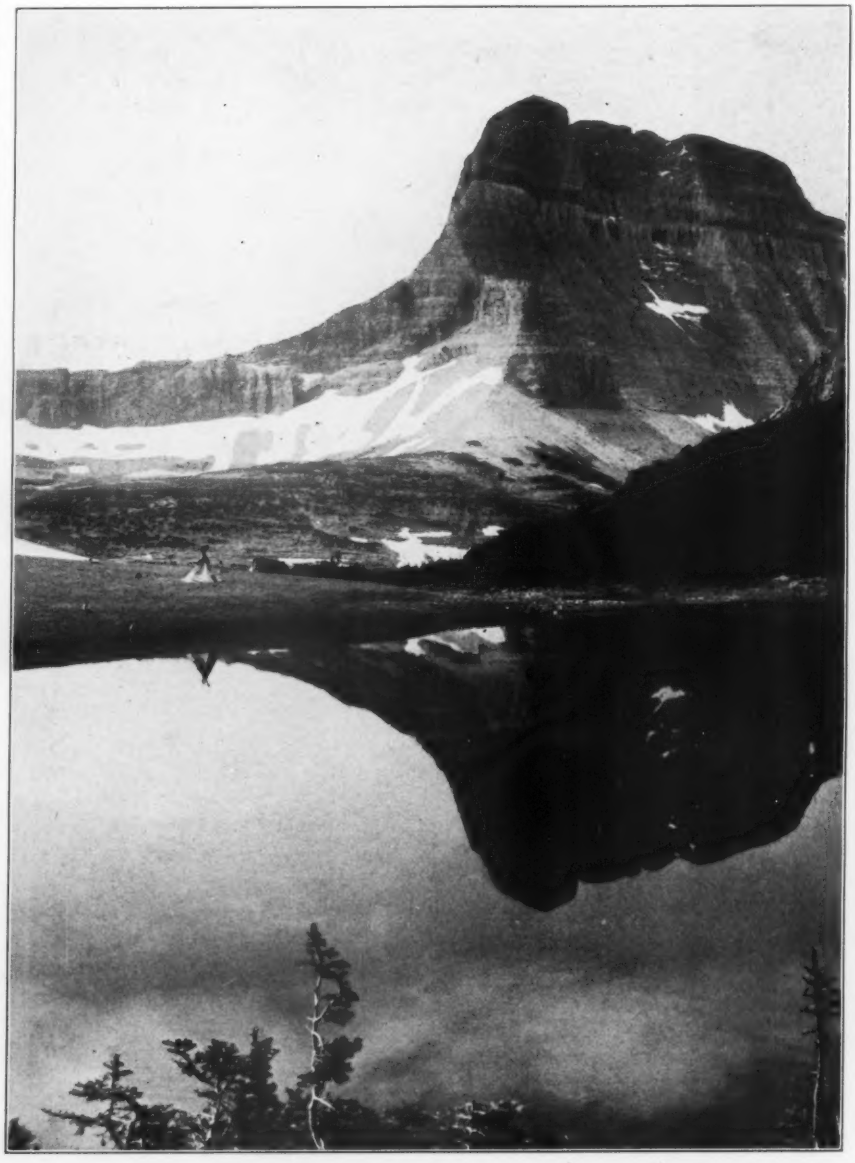


MAJESTIC PEAKS CONFRONT THE TOURIST

So many of the canyons head in small lakes which lie at the very foot of towering precipices, from the broken and stepped surfaces of which small streams of snow and ice water trickle to the lake below.

use than the Indians could ever hope to accomplish.

Scenery there is in abundance, together with innumerable forms of wild life, and it was undoubtedly the part of wisdom to open this most wonderful district to the scenery loving citizens of the United States. But to merely set aside an area and announce through a small bulletin, the total issue of which would not circularize the residents of St. Joe, hardly constitutes opening a great scenic area to a country of one hundred million population; yet this is practically all that the Federal Government has done until a very recent date. That the people of the United States are fairly well informed about the conditions in Glacier National Park and that they may travel through it in more or less comfort, receiving en route courteous attention and that consideration which is well calculated to soothe the temper of him whose attention is invariably concentrated on an empty stomach, is due almost entirely to the efforts of Mr. Louis W. Hill and the Great Northern Railroad. In turn, Mr. Hill may thank such public-spirited men as Mr. Emerson Hough and Mr. George Burt Grinnel for the real pioneering which resulted in bringing this territory to public attention, for it was largely Mr. Emerson's Hough's articles describing the unsurpassed beauty of the hanging glaciers, sparkling streams and glorious lakes of this bit of transplanted Switzerland, which first attracted the attention of nature lovers throughout the country.



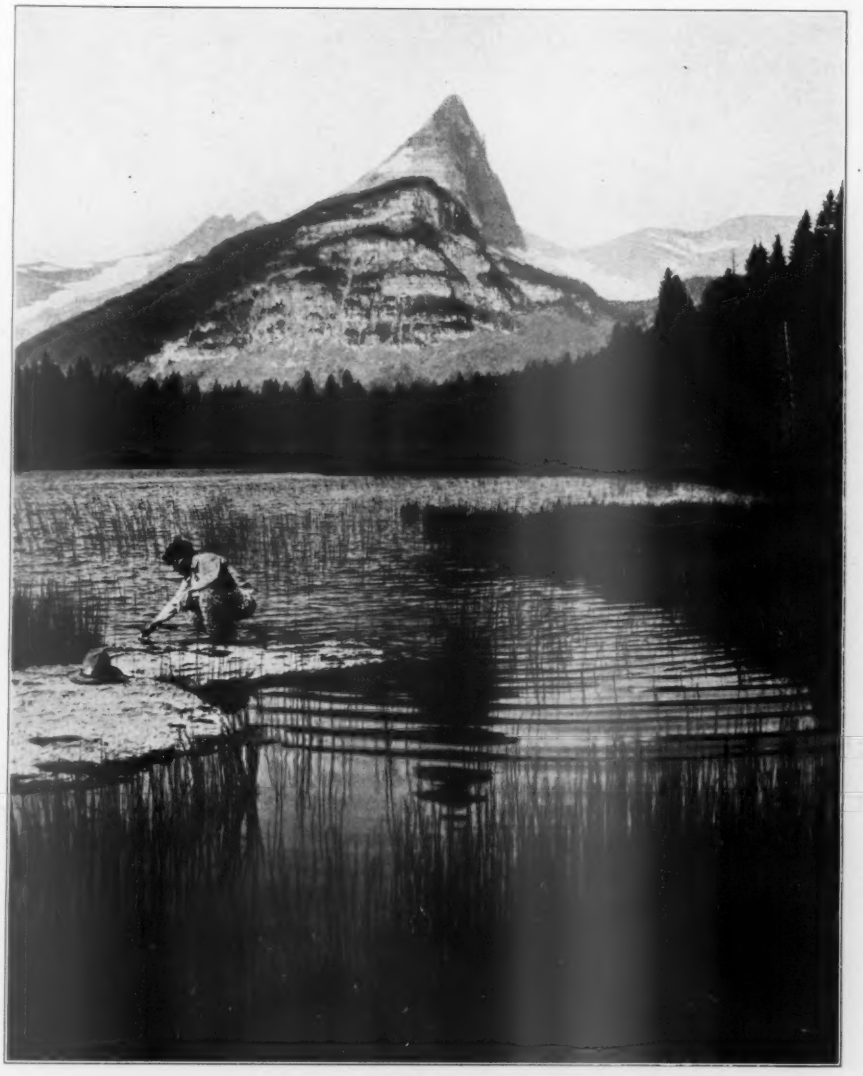
WORTH MANY MILES OF TRAVELLING

The spectacular manner in which apparently isolated peaks raise their lofty crests to such great altitudes that their reflections in the nearby lakes can only be secured from distant points, is a characteristic of the formations in Glacier National Park.

Prior to the act which set the Park aside as such, Mr. Hill had made many trips through the mountains and no doubt used what influence the Interstate Commerce Commission had not amputated to get the Park created. This was accomplished in 1911, and despite his reputation as a good business man, Mr. Hill immediately began to erect hotels, chalets and camps throughout the Park in the face of the disastrous experiences of other concessionaires who had tried to operate on a paying basis under Government control in the National Parks. In the meantime, for the same year, $15,000 only was appropriated for the administration of this Park, the area of which is 1,534 square miles. Since that time it is only fair to say Congress has appropriated in all $320,000 up to and including 1915, which sum, it should be said, is less than one-quarter of the amount of money that Mr. Hill has spent in the same time in the same reservation. Perhaps it was the knowledge on the part of those in authority that the railroad interest would be forced to do this work in case the Government did not, but in any case, the fact that there is a chain of chalets crossing the Park, a large hotel at the eastern

entrance, three other large hotels in the Park and one at the western entrance, is due entirely to the energetic efforts of public citizens. Before launching forth in that form of eulogy on Glacier National Park, the thoughts of which thrill the bosom of everyone who thinks or writes about it, it would seem wise to outline the physical characteristics of the area so that subsequent statements may be justified or at least appear substantiated by a semblance to fact.

The Continental Divide traverses the Park longitudinally in a northerly and southerly direction and approximately in the middle of the area. The western slope, receiving more of the afternoon sun, is not so plentifully supplied with glaciers and is more heavily wooded. On this side the canyons are wider and less precipitous and the lakes larger and more plentiful. The streams rise almost at the summit of the Divide and quickly find the level of the lakes through which the waters of the snow and glaciers pass to join the main and middle forks of the Flathead River which bounds the Park on the east and south sides, respectively. The eastern slope is more precipitous, rugged and broken up with innumerable pockets, as it were, here and there, in which will invariably be found a sparkling lake, on the placid surface of which are reflected the silhouettes of the surrounding lofty peaks. On the western slope there are fifteen main canyons which carry streams from the summit of the Continental Divide to the Flathead River and its middle fork, and in seven of these there are lakes ranging from one mile to ten miles in length, surrounding all of which is a superb forest of pine, fir and cedar. On the eastern slope it would be almost impossible to count the small canyons, heading in glacian cirques and mountain tarns, which stray toward the Blackfeet Indian Reservation. There are, however, some eight or ten that are large enough to be readily recognized as real, grown-up canyons, the largest being the St. Mary Canyon, in which is the Upper St. Mary Lake, about ten miles in length.



HERE BEAVER DAMS MAY BE SEEN

The trail from Going-to-the-Sun Camp to Gunsight Pass skirts the border of several beaver ponds. In this one the reflection of Fusillade Peak is sometimes so perfect as to form an excellent test of sobriety. The success with which the beavers build their dams in this Park strongly suggests the advisability of establishing a school of training for the engineers of the Reclamation Service in the immediate vicinity.

Despite the fact that this is the most broken up and rugged area of its size in the United States, it is strangely easy to traverse on horseback and lends itself to development in a most simple way. There are no such great areas of almost impenetrable territory as can be found in Yosemite National Park and the Mt. Whitney country, for, with the exception of the vicinity of "The Garden Wall," as it is called, it would be feasible and practicable to build trails throughout the entire Park that would be comparatively safe and inexpensive. At present, however, there are only a few circuits which are connected up in such a manner as to make a continuous trip practical, and it is along these circuits that the chalets, hotels and camps of the Great Northern Railroad Company have been built. The most pictu-

resque trip of all is the one which crosses the Park from east to west along St. Mary Lake, over Gunsight Pass to Lake McDonald.

This trip may be taken from either the eastern entrance at Glacier Park Station on the Great Northern Railroad, emerging at Belton on the western side, from whence the westward journey is resumed, or vice versa. From Glacier Park Station an automobile stage carries the passengers through the Blackfeet Indian Reservation, entering the Park about thirty miles to the north, at the foot of the Upper St. Mary Lake. From this point to the hotel at the head of the lake, one may go either by automobile or by boat. If properly advised, he will take the latter route. There is probably no water trip in the world which is more wonderful than the journey up St. Mary Lake into the very heart of the Continental Divide. The walls of the canyon become more and more abrupt until the reflected tops of the walls and surrounding peaks are lost in the depths of the sparkling blue water and it seems that the little boat and its passengers must be crushed in the jaws of the "Demon of the Great Divide." Just beyond the point on which the hotel is located and across the narrowest portion of the lake, there is a small promontory on which has been built a chalet of split shakes with roof weighted by heavy stones. Behind it Little Chief Mountain towers 5,000 feet above the surface of the lake, casting its purple shadows athwart the neck of the gorge. Ringing the head of the canyon are Almost-a-Dog, Citadel Mountain, Fusillade, Reynolds, and that most glorious of American peaks, Going-to-the-Sun Mountain.

The hotel, or more properly the group of chalets, is located on the north side commanding a view up and down the lake and of the surrounding peaks. Unfortunately, the location is too near the base of Going-to-the-Sun to give the best view of that most wonderful of mountains. I know of no peak in the United States whose lofty crest seems so crowned with glory and dignity as this one, nor is there any point of interest on this continent so aptly named. The propriety of the Indian names for the peaks and valleys strongly suggests the advisability of putting an Indian upon the board of United States Geographic names, but it is not surprising that this idea has not occurred to a committee who sees fit to abandon the proper and fitting Indian name of an inspiring peak for some such name as Mt.



ONE OF MANY SUCH VIEWS

Every ridge and spur is broken here and there with a gap through which the serrated crest of the range beyond shows like the front sight of a gun through a notch. Generally there is a small lake somewaere in the picture, nestling at the foot of the crumbling cliffs.

Doody, Howe Ridge and Trick Falls. Such names as Going-to-the-Sun Mountain, Almost-a-Dog, Rising Wolf, Piegan Pass, Two Medicine Lake and Red Eagle Pass, taken from the Indians and their legends, suggest the romance of an earlier time, contrasted with which such names as Mt. Stimpson, Mt. Thompson and Spot Mountain, seem about as appropriate as a bar room in a cathedral. However, each succeeding administration sees another Indian name taken from peak, lake or glacier, and quietly enforces the substitution of the name of some politician whose conception of his own importance seems only to stop short of an actual effort to have the name of the pleiades changed to something which is possessed of more vote-getting propensities.



AN ENORMOUS HANGING GLACIER

To the west of Piegan Pass there is a canyon several thousand feet in depth. The western wall of this canyon rises abruptly and towers to a great height above the trail to the Pass. The picture here shown well illustrates the type of hanging glacier which is so frequently encountered along the trails through the Park.

It is not always possible to trace the source and origin of the names of these peaks and lakes, although there is little doubt that most of the names given by the Indians were prompted by either some legend or incident which happened in the life of one prominent chief or another. Fusillade Mountain, which lies at the head of the St. Mary Canyon, and bounds Gunsight Lake on the north, was named after a curious and rather disheartening experience of a man whose self-acknowledged ability with the rifle had led him to retain the company of an Indian on a hunting trip over the mountain. The story goes that a large bear arose in the trail but a short distance in front of the two hunters. The Indian was of course unarmed and in the rear. The white man, who, by the way, had married an Indian maiden, began shooting at the huge target which was not a stone's throw away. By the time he had fired all but one shell he lost his nerve completely and turned to run. As he rushed past the Indian in his precipitous flight, the latter snatched the gun from the white man's hand and shot the oncoming bear through the heart with the last bullet. The erstwhile white man had fired his ammunition so rapidly that to those at the base of the mountain it sounded like a veritable fusillade and the mountain was known thereafter amongst the Indians as Fusillade Peak, or, rather, by some word which, in their language, approximated the word fusillade as closely as possible. The trail from St. Mary Camp or hotel over Gunsight

to the head of Lake McDonald skirts the southern base of Fusillade Mountain and at Gunsight Lake rises to an elevation sufficient to bring out the reflections of the ridge in the little lake below.

The trail from St. Mary Camp to Gunsight Pass is for some eight miles along a comparatively level stretch of ground at the bottom of the St. Mary Canyon and skirts the meadows and beaver lakes which dot the valley floor from the upper end of St. Mary Lake to Gunsight Lake. By leaving St. Mary at a reasonably early hour, Gunsight Lake and the chalet on its border are easily reached by noon, where a surprisingly good lunch is served with which one can fortify himself for the climb to the Pass.



A VIEW ALONG THE TRAIL

Along the entire trail from Piegan Pass to McDermott Lake, the towering heights of the Garden Wall dominate the scenery. The knife-like ridge of this portion of the Great Divide seems to be but a few hundred feet in thickness where it peeps over the crest of the formations in the foreground. Snow-white streams of snow and ice water trickle down the faces of the cliffs to keep the fields of wild-flowers fresh throughout the summer.

Gunsight Pass lies approximately midway between the camp at Gunsight Lake and the Sperry Camp on the west side of the Divide. If the trip is taken in the direction of east to west, the Pass bears no resemblance whatever to a gunsight until the western edge of Lake Ellen Wilson is reached. From this point, by looking back, the distant shoulder of Mt. Jackson may be seen through the notch of the Pass like the front sight of a gun. If the time is about four in the afternoon the picture is one that will never be forgotten, for the notch will probably be in shadow while the peak in the distance will be aglow with the afternoon rays. It is but a mile or two from the lake to Sperry Camp at the head of Sprague Creek where food and shelter can be had for the night. The camp is located at an elevation of about 6,500 feet and commands a view of Lake McDonald, over 3,000 feet below, and the pine-covered ridges of the Blackfeet National Forest further to the west. From this chalet it is but two miles to the Sperry Glacier, which lies on the northern slope of Gunsight Mountain and supplies Avalanche Lake with the milky water that makes it one of the most beautiful gems of color in the Park.

From Sperry chalet to Lewis's, at the head of Lake McDonald, is but a short trip through the dense forest covering the western slope along Sprague Creek. If properly timed, arrival at this unusually good hotel is sufficiently early to permit of some loitering in the vicinity which will invariably prove to be well worth while. From the hotel to Belton the trip is made by boat on Lake McDonald and a three-mile drive by stage from the foot of the lake to the railroad station.

This route constitutes the one generally taken by tourists who wish to travel more or less de luxe, and while it seems particularly strenuous and somewhat terrifying at the time, it is one that can really be taken with little or no inconvenience and without any serious delay in westward travel. If the tourist, however, has more time at his disposal, there are other trips that would more than justify the time necessary. For example, from Going-to-the-Sun Camp at the head of St. Mary Lake there is a trail leading to the north up Reynolds Creek to Piegan Pass. The trail is almost wide enough to accommodate a small motor throughout a large portion of its length, and climbs steadily and gradually to an elevation of about 7,200 feet at the summit of the Pass. From this point the view to the south is astoundingly impressive. Most of the Blackfeet Glacier, covering several square miles, lies sparkling in the sunshine like a white diamond held in the forked setting formed by the ring of lofty and pagged peaks that make a semicircle in the Great Divide about the head of St. Mary Canyon.

To the west, on the eastern slope, is a smaller hanging glacier, from the blue white face of which small streams tumble down the almost vertical face of the mountain to the canyon floor below. It is truly difficult to leave the place, and the regrets of departure are sharp until the descent of the northern side of the pass is begun.

From here the trail swings around the base of the Garden Wall, as it is called, and follows the course of Cataract Creek. From one point in the trail just below Mt. Gould this stupendous cliff rises to a height of over 4,000 feet above the trail, forming a precipice that competes favorably with the heights to be found in Yosemite and Whitney country, with the added advantage that the rock is richly colored in deep red and purple hues. There is no bit of trail in the Park that is more beautiful than the lower reaches of the trail along Cataract Creek which emerges onto the floor of the canyon by Lake



NELLY NO-CHIEF

So yclept in spite of the American repugnance for hyphenation, has no dread of the camera, nor does she wear a costume in keeping with her title. The Blackfeet Indian maidens are in general rather more attractive than any of the tribes in the Northwest.

Josephine and McDermott Lake. At the latter place the Great Northern Railroad Company has this year completed a hotel which is considerably larger than the one at Glacier Park Station. It faces to the west, overlooking Lake McDermott, and, as the evening draws on, lies in the shadow of Mt. Grinnell. From this point there are several side trips to be taken that are astoundingly beautiful. There is the trip over Swift Current Pass to Granite Park, the trail of which passes along a series of unnamed lakes and climbs to the summit of the Divide to a point about seven miles from Lake McDermott. All along this trip one is apt at any time to discover here and there on the apparently vertical faces of the cliffs scrambling goats that seem to be creeping likes flies up the mountain sides, or to flush a grouse, or disturb the peaceful meditations of a ptarmigan hen.



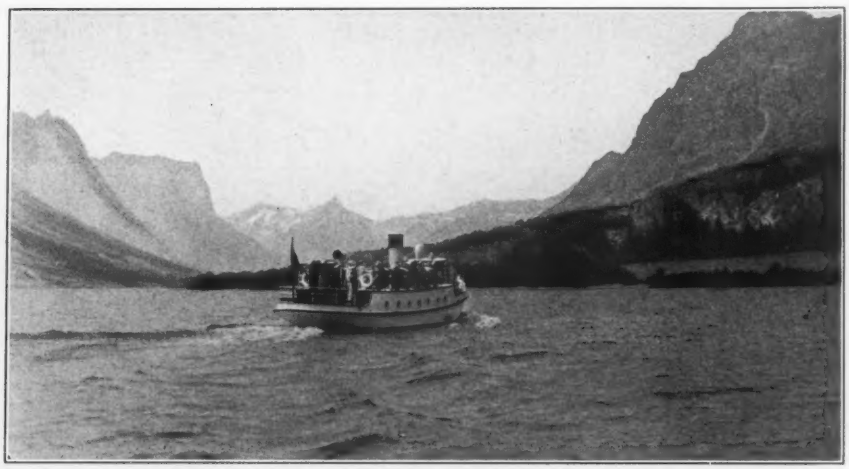
THE INDIANS OF THE PARK

The Indians of the Blackfeet Reservation congregate about the Glacier Park Hotel and display none of that repugnance for photography that is almost invariably encountered amongst the Indians of other tribes.

From Granite Camp a new trail has recently been built, leading down to the upper end of Lake McDonald, and it is now practical and feasible to cross the Great Divide by a route other than the one over Gunsight Pass.

Another most interesting trip is the short one to Iceberg Lake, about seven miles from Many Glacier Hotel on Lake McDermott. The trail follows along Wilbur Creek, turning at the first main fork toward the west, and winds up the small canyon to the little lake that lies in a cirque below the crest of the Divide. On the western edge of the lake a glacier dips its toes into the pale blue waters and now and then fills the canyon with the roar of falling icebergs. The sight of one of these huge bergs of ice falling into the sparkling water is one that is not easily forgotten. It was my good fortune to emerge onto the level of the lake just as a berg broke off from the face of the great glacier and fell into the

lake with a roar that reverberated for several minutes through the canyon. It disappeared completely from sight and then arose with its snow-white top swaying gently from side to side, spilling sparkling streams of water from the ice cups of its surface. Such a sight



UNEXPECTED AND CONVENIENT

The appearance of a modern pleasure launch on the surface of a 10-mile lake in the heart of the high Rockies invariably strikes one as a bit of anachronism. The pleasure, however, which it affords, always tempers what little heat of antagonism may be left.

invariably prompts a man to scream or swear or otherwise give evidence of that unfamiliar emotion which is always aroused by God's phenomena in him whose conception of magnitude is born of his knowledge of skyscrapers. If you are a hard rider and can tear yourself away from the beauties of this spot, it is possible to run up to Grouse Lake at the head of the other fork of Wilbur Creek on the return trip, but unless the feel of a mule between your hardened knees is old and familiar, it is not advisable to attempt the round trip in one day.

There are so many trips and so many spots of glorious colors in this Park that it is not within the scope of a magazine article to enter upon any detailed account of them. There are the Glenns Lake, the Canyons of the Belly River, Waterton Lake, which is split by the international boundary line. The broken and disrupted country in the vicinity of Logan Glacier, the great Kintla, Bowman and Quartz Lakes, and countless other fascinating spots in the northern part of the Park where few people ever travel.

On the other hand, there are the Upper and Lower Two Medicine Lakes, than which there is no more beautiful sight held within the spell of mountain peaks which are but a few hours' horseback ride from the hotel at Glacier Park Station. In fact, there is within the boundaries of this Park scenery of every kind which is accessible to people of almost every kind of physical condition, fishing and camera hunting to the heart's content, and it is to be devoutly hoped that our Federal Government may see fit at some time or another to appropriate sufficient money to make all of this Park accessible by roads and trails to those who love their country and contribute to its support.

A FORESTRY MAXIM

La Asociacion de los Amigos de la Fiesta del Arbol, of Barcelona, Spain, has just issued "La Cronica de la Fiesta del Arbol en Espana," a beautifully gotten up book of 184 pages, giving a description of the "Arbor Days" held in Spain during 1914 and 1915. Among the "forestry maxims" quoted is one which says, "He who plants a tree does a good work, he who plants many rebuilds and enriches a portion of his native lands and achieves a conquest which causes not one tear nor sheds one drop of blood."

RESOLUTION ON FOREST FIRES AND REFORESTATION

THE following resolution introduced by Prof. P. S. Lovejoy, of the University of Michigan, was adopted by unanimous vote at the spring meeting of the Technical Association of the Pulp and Paper Industry, held at Kalamazoo, Mich., and the secretary was instructed to send copies of it to the various State forestry associations, the Governors of States and the press generally:

Since wood is an essential raw material of the pulp and paper industry, and

Since the supply of timber suitable for pulp manufacture is rapidly decreasing and its cost is rapidly increasing, and

Since there are great areas of non-agricultural lands in the Lake States, which lands once produced splendid timber, but are now practically barren as the result of lumbering and repeated fires.

We therefore urge that the pulp-producing States take immediate action.

(1) Looking toward the better protection of these non-agricultural lands from fire.

(2) Looking toward the restocking of such lands where necessary by planting.

TOYS FROM SULPHITE PULP

AT THE recent toy manufacturers' convention held in Toronto, Sir George E. Foster pointed out to the members the possibility of making toys of all kinds from sulphite pulp, which was much cheaper than brass, copper and other metals, which have risen very much in price owing to their demand for use in making munitions. A toy-making industry has recently been established in Berlin, Ontario, which is making lighting fixtures from sulphite pulp. The material is blown under molds under pressure and given any desired finish.

The Bird Department

By A. A. Allen, Ph.D.

Assistant Professor of Ornithology, Cornell University, Ithaca, N. Y.

THE ENEMIES OF BIRDS

WHEN the white man first came to this country and before he began clearing the forests and starting the rudiments of our present agriculture, he found what has been called a "balance of nature." Each plant and animal in the struggle for its existence and the persistence of its kind, had developed a strength and a productive capacity that required holding in check by the struggles or foraging of other species. And each species was so held in check that this balance existed. While this condition endured there were no weeds, no insect plagues, and no infestations of small rodents. Each species increased up to the limit of its food supply and then was controlled by starvation and the attacks of its enemies. Insects and rodents, together with the lack of sunlight due to the shadows of the forests, kept the vegetation within bounds. The insects and rodents were held down chiefly by the birds, and an excess of birds was prevented by the carnivorous animals and a few species of hawks.



AN ENEMY OF THE BIRDS

The raccoon is as good a climber as the cat and nearly as destructive to bird life but, of course, not nearly so abundant.

When the early settlers cleared the forests and planted and cultivated their gardens, they let in the sunlight, they enriched the soil and they supplied the native plants as well as their crops with suddenly increased nourishment. Thus they all flourished. New plants that had had to starve in the old country crept in with the crops, and responding to the luxuriant conditions, escaped beyond control and became "weeds." The effect on the insect life was equally remarkable. The locust and the cricket, formerly fighting for a meager existence on the prairie grass, suddenly found themselves in a Garden of Eden and increased so tremendously that for a long time in the Mississippi Valley, it was almost impossible to raise crops



THE RED SQUIRREL

On friendly terms with the birds at a feeding station but individual red squirrels often develop nest-robbing habits.

of any kind. The Colorado potato beetle which had been eking out its existence on a few species of plants related to the potato in the Rocky Mountains, was suddenly confronted with a perfectly inexhaustible food supply in the open cultivated fields where there were no birds or other enemies. Each female beetle lays so many eggs and the young transform to adults in such a short time that in a single season it is possible for the offspring of one pair of beetles to number over sixty millions. Quick to respond, this beetle in a very few years spread from its native State all over the West and throughout the East until it became a perfect scourge in all places.

But what of the natural enemies of the insects, the

birds? Before them, likewise, was thrown a greatly increased food supply. How did they respond? Of course their reproductive capacity cannot compare with that of plants or insects, but it is sufficient to allow of great increase. Undoubtedly this increase did take place, and today there are unquestionably more robins, song sparrows, and chipping sparrows than there were 300 years ago. But unfortunately, birds require more than food. They must have shelter for themselves and their nests and the cultivated fields offer this to only very few species. One more factor, perhaps the most important of all, is necessary to bring about an increase, and that is a lessening of the number of their enemies. As long as there are carnivorous animals to gobble up the young as fast as they flutter from the nest, or predaceous birds to pounce upon the adults as they incubate, we can hope for but small change in their numbers. A reduction of these enemies, however, would undoubtedly cause an immediate increase, for few species are living up to the limit of their food supply, and if necessary this could be readily augmented.



AN EFFECTIVE SPARROW NET

About twenty feet square, made of cheese cloth. It is raised into place against the ivied walls after the sparrows have gone to roost and when lowered it scrapes them from their perches. Over 500 have been taken from one roost in a single night. The numbers of house sparrows must be considerably reduced before great headway can be gained in increasing our native birds.

Of the enemies of birds, the lynx and the marten, the mink and the weasel, the fox and the raccoon certainly decreased very rapidly before the encroachments of agriculture and are now rare in most places. The hawks that prey upon birds are likewise more scarce, so that there is apparently no natural reason why the birds should not have increased proportionately with the vegetation and the insects. But, sto for one minute and remember that for every lynx that has been shot, for every fox that has been hounded, for every marten, mink or weasel that has been trapped, there have been brought in by civilized, unthinking man at least two dozen ferocious, bird-killing cats; black cats, white cats, maltese cats, angora cats, house cats, barn cats, alley cats and stray cats, all with 18 sharp, skin-ripping talons and 30 flesh-tearing, bone-crunching teeth; all with an inborn instinct to hunt and to kill; unsatisfied by any amount of food and, with few exceptions, every one of them turned loose every night of the week to make the night hideous with their love chants and gory with the blood of their victims. If we could make a funeral pyre of the birds killed during the month of June by cats alone, in the United States, it would conceal the Washington Monument.

Data recently collected by E. H. Forbush, the State ornithologist of Massachusetts, and the opinions of naturalists all over the country prove the domestic cat to be the greatest scourge to bird life in this country. Yet most owners of cats feel little or no responsibility. If a neighbor's cow gets into one's garden, or a neighbor's dog into the sheep pen, there is a great uproar. The dog must be killed, damages must be paid and the law will uphold such a course. If, however, the neighbor puts his cat out at night to shift for itself and, in the early morning it comes to one's garden and pounces upon the wren gathering spiders for its young or springs upon the chipping sparrow picking worms from the cabbages or climbs the vines and snatches the young robins from the nest on the porch, nothing is said, nothing can be done. No one is held responsible but the cat and the cat has merely followed its instincts to hunt.

When the neighbor's cat has kittens, they make interesting playthings for his children, but when they get big enough to scratch and their food gets expensive, he finds that he must part with them. He is too tender-hearted to kill them, and so he puts them in a basket and carries them to the edge of town and drops them over the fence into the nearest woods to shift for themselves and their bird killing begins.

Later on the neighbor goes to the seashore and, being very fond of his cat, he takes it with him. It is fine for the cat to have this outing with a new roaming ground, and the cat shows its appreciation by hunting most of the time. When preparing to return home in the fall, our neighbor is a little late in getting started for his train, or he can't find the cat basket, or the cat is off hunting, and so, expressing his regrets that he should have lost such a fine cat or wondering if it will recognize him when he comes back next year, he starts for the city and leaves the cat behind.

Some day after the close of the season at such a resort, go out in the morning after a light fall of snow and track

the wild animals of the nearby woods. Perhaps you will find the tracks of a red squirrel; squirrels are very clever and usually manage to exist even in cities. Perhaps you will find the tracks of a cottontail; rabbits are very prolific and stand a great deal of persecution. Probably you will find the tracks of a few rats and mice; but be assured you will find crossing and recrossing, the tracks of at least one stray cat. I do not believe there is a place in Eastern United States within five miles of a human habitation where you will not find the tracks of domestic cats more frequent than those of any wild animal, squirrels, rabbits and mice excepted. Trappers catch them in their traps set in the wilds, hunters find them in the deep woods when hunting for bear and deer; and time and again, when I have been in the woods far from any house, "squeaking" to call up the birds, I have become aware of some light-footed animal sneaking up through the bushes ready to pounce upon the young bird which I am imitating. Once in a great while it is a weasel; less often it is a fox, and forty-nine times out of every fifty it is nothing but a stray, hunting cat. At times I have recognized the cat as belonging to a neighbor whose cat "never catches birds," but more often it is a lean, wild-looking animal that knows no owner and may even have been born in the woods, for we are rapidly developing a strain of half wild cats that spend their entire days in the woods and fields and have never known the habitations of man.



A BIRD FOUNTAIN

Many species of birds visit such fountains daily and add very much to the attractiveness of the garden. The fountains are of many varieties, few of them costly, most of them artistic.

"But my cat never catches birds," is the response of many people. "I whipped it every time it caught a bird until it now knows better."

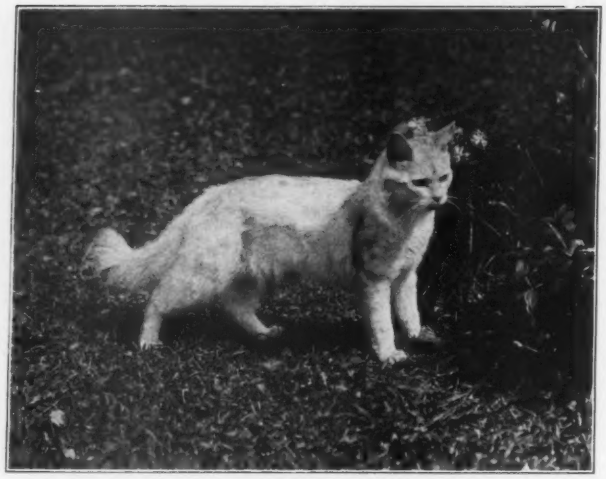
Yes, undoubtedly the cat can learn, for cats are certainly quite intelligent, but they merely learn not to bring into the house any bird that they catch.

It is true that cats can be taught not to touch caged birds; they have even adopted young chickens and tame quail. But put any cat out into the woods and fields, let a young bird flutter from a nest or an old one venture too close in its defense, and no matter how well trained, no matter how stupid or slothful the cat, it could not resist its instinct to capture. A great deal can be done and ought to be done to minimize the chances of one's cat catching birds and certainly the number of birds killed by cats can be greatly diminished. Every owner of a cat and every cat-lover should feel it his responsibility to cooperate with the naturalist and bird lover to control the depredations of this animal.

This does not mean that all cats should be killed or that there is no place in the general scheme of things for the domestic cat. The lion is safe in the circus cage; the tiger does no damage in the zoo; the bloodthirsty little ferret can be kept by anyone with impunity. Dynamite, strychnine, and carbolic acid all have their value, but all are kept with responsibility and used with caution. If one has a fondness for the playfulness of the kitten or cares for the indifference and selfish responses of Tabby or likes to raise fancy breeds of cats for display, it is perfectly legitimate that he should possess them. If one prefers to care for a cat rather than to set a trap, the former will often prove nearly as effective as the latter in destroying those obnoxious little rodents that often do much damage. A good rat-catching cat (and they are scarce) is a decided asset about the barn. But, if one decides to keep a cat, he must at the same time decide to assume the care and responsibility which its ownership imposes. It is not true that a cat makes a better ratter if it is not fed. Cats have much more patience to wait at the rat hole or to stalk the mouse if they are fed regularly. Moreover, if a cat is kept to catch rats and mice in the house and barn, it should be kept where it is supposed to hunt and not turned loose in the woods and fields where hunting is so much easier. It is a common practice to put the cat out at night just when it is most needed inside and just when it can do the most damage outside. If this practice could be stamped out, if everyone would put the cat in the cellar or lock it in the barn at night and feed it in the morning before turning it loose, the cat problem would be solved. No one would keep any unnecessary cats; stray, hunting cats could be identified as such and put out of the way, and the country would soon be

enriched by the addition of the thousands, even millions of birds that are annually killed by cats.

In discussing the enemies of birds, I have dwelt at length on the domestic cat because I believe that it is by far the most important, most deadly of them all. Our birds are able and always will be able to contend with their natural enemies. The lynx, the fox, the raccoon, the mink, the weasel and the skunk are rapidly disappearing before the inroads of the trapper and nowhere exist in sufficient numbers to affect bird life seriously. The bird-killing hawks and owls are nowhere abundant. Crows, jays and squirrels do not levy a heavy toll, though at times they are very destructive to eggs and nestlings. All of these animals, however, have their economic and aesthetic value which forbids their wholesale slaughter. If an individual red squirrel is seen robbing a bird's nest, he should be shot, and if a crow takes to visiting the robins' nests in the orchard, he, too, should be killed, for it is impossible to cure this carnivorous habit. Opprobrium should not be heaped upon the species as a whole, however, because of the misdeeds of a few.



BEWARE, ROBIN!

More birds are killed by cats than by all their other enemies put together. The stray unfed cat is the deadliest, but even the pampered Persian springs upon them whenever opportunity offers.

Concerning the English or house sparrow whose fondness for human habitations, adaptability, and great reproductive capacity have caused it to replace a large percentage of the native birds about our cities and villages, much might be said. It is undoubtedly true that before we can increase our native birds in such places it will be necessary to reduce the number of sparrows. It will never be possible, however, to exterminate the house sparrow although concerted effort has succeeded in ridding a few localities, notably Meriden, N. H., and Oberlin, Ohio, of them. But county systems and wholesale slaughter are seldom to be recommended because so many other species are killed by mistake. It is possible, however, by consistent trapping and netting to reduce their numbers sufficiently to make room for a great increase in our native birds. The nesting boxes that are now put up for bluebirds, martins, tree swallows and woodpeckers will then be used by these birds instead of being usurped by the sparrow. The barn swallows and eave swallows will return to our barns, the goldfinches and waxwings to the maples, the chipping and song sparrows to the hedges, the warblers and vireos to the gardens and our lawns will resound with the music of native birds instead of the chatter and broils of these noisy interlopers.

In addition to the traps described in the U. S. Department of Agriculture Farmers' Bulletin on "The English Sparrow as a Pest," the accompanying photograph shows a net that has been used very successfully from August until November when the sparrows roost in the ivies on the walls of many buildings. It is about twenty feet square, made of cheese cloth. It is raised into place against the wall after the sparrows have gone to roost and when lowered it scrapes them off from their perches to the number of over a hundred at a sweep. Over 500 have been taken from a single roost in one evening.



CAT TRACKS

More abundant in the woods than the tracks of any wild animals. Cats should be locked up at night and not allowed to hunt in the woods and fields where they kill countless numbers of birds.

The starling, introduced into New York City in 1891, is now likewise multiplying and spreading nearly as rapidly as the sparrow. While it is abundant only in the country adjacent to New York City, it has spread to most of New England, New Jersey, Eastern Pennsylvania and New York and the advance guard even to Ohio, so that within ten or fifteen years it will undoubtedly be abundant all over the East. The economic status of this bird is still somewhat undecided, although it is much more insectivorous than the house sparrow. It is very quarrelsome and, nesting in holes in trees, it is rapidly driving out the blue birds, flickers and other hole-nesting species.

BIRD LIFE IN JULY

July is a month of transition. Many species of birds are still nesting while some are already beginning to get ready for their southward journeys. The waxwings and goldfinches are just beginning to build their nests but the majority of species have either completed their family cares or are starting again on a second brood. The swallows and the blackbirds have gathered into flocks, the former congregating on the wires especially along lake shores and the latter assembling in great concourses in the tops of the evergreens and in the marshes.

The rainy days of June are at an end and standing pools of water and even springs begin to go dry so that water becomes scarce. The birds now begin to desert the dry hillsides and even the gardens where no water is available, and move down to the borders of streams and moist woodlands. Now is the time to begin putting out water for the birds if you have not already commenced. A bird bath or fountain in the garden will not only retain the birds already there but will draw in many others. If you can have running water, so much the better, but if not, even a shallow pan in which the water is replenished will be serviceable. It must be less than an inch deep where the birds are to enter and the bottom must not be slippery. The accompanying photograph of the fountain in the garden of Professor and Mrs. J. H. Comstock shows how the bird bath may be made one of the most attractive parts of the grounds. Many species of birds come here to drink and bathe and they add much to the beauty of the garden.

California Forest Fire Protection

By George R. Rhodes

Secretary, the California Forest Protective Association

WHILE the records for the last three years, as shown by the reports from forest owners and the Federal Forest Service, show that forest fires in California have been steadily decreasing and the damages to timber and cover growth has almost reached the vanishing point, the California Forest Protective Association is continuing its efforts to enlist the cooperation of all interested for further prevention of forest fires.

The reports covering timberlands outside the areas protected under cooperation with the government for the past three years, show a constantly decreasing area burned over with less damage each year, as follows:

1913, 6,330 A. burned over, damage.....$1215.00
1914, 1,650 A. burned over, damage..... 750.00
1915, 1,145 A. burned over, damage..... 660.00

The report of the Federal Forest Service for District No. 5, covering California, on cooperative fire protection for 1915, shows that 28 lumber companies, the Southern Pacific Railroad and fire protective associations composed of timber owners, cooperated with the Federal Forest Service in protecting 2,601,138 acres of timberlands from forest fire at a total cost of $8,832.49, or nearly $.004 per acre. While inexpensive, this cooperation was effective as is shown by the fact that only 8,016 acres were burned over with a total loss of $899.75, or 11 cents an acre on the area burned over.

In addition to this cooperative protection the California Forest Protective Association reports show that timber owners expended over $14,000 for further protection and had 14,036 men available to fight fires in emergencies.

Cooperation with the Federal Forest Service, both by individual forest owners and associations of owners has been so satisfactory in every way that it has been rapidly extended during the past three years and will doubtless be further extended in the future so that practically all of the privately owned timberlands adjacent to the National Forests will be under cooperative protection. This will cover practically all of the pine forests of the State.

The remainder of the California forests are practically all in the redwood belt along the coast where the moist, foggy climate during the summer, the undergrowth of low growing evergreens such as ferns, the thick bark and peculiar qualities which render the redwood almost immune from fire, contribute to conditions which make destructive forest fires in the redwoods almost impossible.

While a very small part of the redwood forests is adjacent to National Forests, and for that reason there is little opportunity for cooperation between the owners and the Federal Forest Service, yet the owners individually and in cooperation with one another, and also through organized associations, carry on a thorough, effective system of protection against forest fires. And this protection extends also to the cut-over lands where the danger from fire is greatest, and which promotes reforestation.

In carrying out encouragement of cooperation for prevention of forest fires, which has been established as a regular work of this Association, a letter was mailed to each of the five members of the Board of Supervisors in the twenty-eight timbered counties. That this was effective in securing the attention and cooperation of the Supervisors is shown by the following quotations from letters received:

"I have your letter of the 15th and note what you say in regard to brush and grass fires, which at times do great damage to the forests. Please be assured that we will always be glad to cooperate with you with these objects in view."

"I wish to acknowledge receipt of your communication of April 15 relative to brush and grass fires. I wish to say that this county will in the future, as it has in the past, through its Board of Supervisors, do all it consistently can in this matter and I will be pleased to bring this matter before our board at its next meeting to this end."

"I have sent all through my district notices as sample enclosed, which we hope will be satisfactory."

The sample mentioned was a notice printed on cloth 10 by 18 inches and worded as follows:

BE CAREFUL
NOT TO THROW AWAY
BURNING MATCHES OR TOBACCO
Do your best to prevent brush, grass and Forest Fires and Save Valuable Property.

At the same time a letter asking for the assistance of the newspapers in giving publicity to forest fire protection work was mailed to newspaper editors throughout the State. That the newspapers gladly assisted in bringing this to the attention of their readers is shown by the fact that articles were published in practically all the papers throughout the State. In addition to this, some of the timber owners contributed articles to the papers in the localities where they were interested, calling attention to local conditions, all of which was most effective.

Perhaps the greatest value of such newspaper publicity arises from the fact that it brings about a better understanding between the people and forest owners in regard to their common interests.

THE PENNSYLVANIA FORESTRY MEETING

THE midsummer meeting of the Pennsylvania Forestry Association at Reading, Pa., June 27-29, was a great success. Not only were the sessions well attended but the papers and addresses were of much practical benefit and the outings at which it was possible to view extensive forest planting on the estates of Jacob Nolde and George T. Horst, as well as the municipal nursery containing 30,000 coniferous seedlings, and the extensive plantings under the direction of the Berks County Conservation Association, were of unusual instructive value to the many foresters, students and lovers of trees and forests attending the meeting.

Officers and members of the American Forestry Association, instructors in forestry from a number of forest schools, forestry students from the Pennsylvania State College and the State Forest Academy at Mont Alto were among the guests, and these, together with the members of the Pennsylvania State Forestry Association and the Berks County Conservation Association, made up a large and enthusiastic party on the several attractive trips which had been arranged. A number who had been present two years previous when the Berks County Association was organized took special interest in seeing the development of its work for conservation and the rapid and substantial growth manifested not alone in tree planting but in the large number of people who have become interested in carrying on the work.

Dr. J. T. Rothrock, president of the Pennsylvania Forestry Association, presided at the meetings, assisted by Dr. Henry Sturgis Drinker, director, and for three years president of the American Forestry Association, and State Forest Commissioner Robert S. Conklin. Addresses were made by Jonathan Mould, president of the Berks County Conservation Association; Dr. Joseph Kalbfus, Pennsylvania State Game Commissioner; James B. Sansom, of the Wild Life League of Pennsylvania; Harris A. Reynolds, secretary of the Massachusetts Forestry Association; Marion G. Sellers, of the Pennsylvania State Fish and Game Protective Association; N. R. Buller, of the State Department of Fisheries; Samuel J. Waid, of the Boys' High School of Reading; V. A. E. Daecke, of the State Department of Agriculture; Dr. Filibert Roth, of the University of Michigan; Dr. Whitmer Stone, of the Pennsylvania State Audubon Society; Prof. J. A. Ferguson, of the Department of Forestry, State College; and State Foresters Robert S. Conklin, Nelson R. McNaughton and George S. Perry.

Resolutions were passed thanking all who participated in making the meeting a success; congratulating the Berks County Conservation Association and the city of Reading on the conservation work accomplished; expressing appreciation of the work of the Wild Life League, the United Sportsmen, the State Game and Fish Protective Association and the State Sportsmen Association, all of Pennsylvania; expressing pride in the efficient administration of the forestry interests of the State under the able management of the Forestry Department and its experienced head, the Hon. Robert S. Conklin, and earnestly advising against any consolidation of the Departments of Forestry, Fish and Game, and Water—as tending to destroy initiative, and efficient and effective management of each and all of them, and as being against the general experience and judgment of experts in other states.

The resolutions also declared: "We particularly impress on forest lovers the need of immediate attention being given throughout the country to the danger of the spread of the White Pine Blister Rust, a tree plague that is likely to be as devastating and as serious in its results as the Chestnut Blight. The proper time to act is now before the disease has spread."

THE MISTLETOE A FOREST PEST

A RECENT study, conducted by the U. S. Department of Agriculture, of the injury done by mistletoe to coniferous trees in the Northwest indicates that in many regions this is a serious forest problem. The western larch, the western yellow pine, the lodgepole and the Douglas fir suffer the most. Each of these is attacked by a particular species of mistletoe which gradually reduces the leaf surface of the tree and thus causes a great reduction in growth, both in height and in diameter. Excessive mistletoe infection of the lower branches of the tree may cause the upper portion of the crown to die, giving rise to what is commonly called staghead or spiketop. Severe infection throughout the entire crown often results in the death of the tree. Young seedlings from three to six weeks old may be killed within a comparatively short time after they become infected. Furthermore, trees weakened by mistletoe infection are much more susceptible to attacks from fungi and forest-tree insects.

The Columbia Highway in Oregon

By Henry L. Bowlby

Formerly State Highway Engineer of Oregon

THE nation-wide campaign for better roads has been responsible for the construction, during the past five years, of many highways that not only have a local interest but also are of national importance. The continuance of the European war has added an unusual impetus to the building of trunk highways that will enable Americans to "See America First" and at the same time link together neighboring states with a means of communication that will form an important part in any plan for national preparedness.

For the growth of these national highways the Pacific Coast has proven to be the most fertile ground. An immense territory, with few existing roads, it is a paradise for the highway engineer, affording as it does an opportunity to display his ingenuity and to put into practice the best there is in modern highway engineering.

Our Pacific Coast States are separated from the main part of the United States by an almost impassable barrier. The Cascade Mountain range is unbroken from British Columbia to Mexico, except in three places; the Frazier River on the north in Canada; the Klamath River between Oregon and California; and the Columbia River between Oregon and Washington.

There are several passes which make it possible for the transcontinental railroads to reach the coast during most of the year. Every winter some or all of these railway lines are blocked by snow. The only route to the Pacific ocean that was open every day this past winter was the Columbia River route, and it is along this route that the wonderful Columbia River highway is being built, a highway which is one of the most notable of the scenic attractions of the Pacific Coast.

The great gorge of the Columbia River provides some of the grandest scenery in the world. Its beauties have been portrayed by John Muir, John Burroughs, Joaquin Miller, and many other lovers of the beautiful in nature.



THE FAMOUS VIEW FROM CROWN POINT

Here the road makes an almost perfect circle around the big bluff which overlooks the river. This is a favorite stopping place for the traveler and is perhaps the best viewpoint along the entire route. The river may be seen for a long distance in each direction, and there is a fine view of the country on the north bank of the stream.



A TYPICAL VIEW OF THE RIVER

Many such views burst upon the vision of travelers as they sweep around the curves of the highway. The height of this point above the river is indicated by the railroad which is seen far below the highway.

The Columbia River canyon is so rugged that no attempt to build a road through it was successful until the project started in 1913. The need of a highway to connect the Oregon seacoast with the broad, fertile acres east of the Cascade Mountains has long been recognized and it was largely due to the foresight and initiative of Mr. Samuel Hill, a past-president of the American Road Builders' Association, that this highway has been constructed.

In 1913 the building of the Columbia Highway on its present magnificent scale was undertaken. The State Highway Department, which was created the same year, had charge of its location and the engineering of all kinds required in its undertaking. Oregon was the last of the Pacific Coast States to establish a highway department. Hill's influence was felt again in this matter. In February the members of the Oregon Legislature were his guests on a trip by special train to Maryhill, his country estate on the Columbia River. He had built, at his own expense, several miles of modern hard surfaced road near his ranch, costing $120,000. After listening to an illustrated lecture on roadbuilding by Mr. Hill and



MULTNOMAH FALLS

This is one of the chief scenic features of the highway. A bridge over the bottom of the falls is barely discernible among the trees in the middle of the picture. A winding trail leads to the top of the bluff above the falls. There is another beautiful view from this point.

inspecting thoroughly these roads, the Legislature enacted the law providing for a State highway engineer and a system of State roads. The State Highway Commission, thus created, secured the services of the writer as State Highway Engineer, and launched an extensive road-building campaign.

No money was available for the use of the department except $10,000 set aside for office expenses. A campaign of education was started with the object of inducing the counties to vote bonds to build trunk roads under the direction of the State Commission. The first to take advantage of the new law was Jackson County. On July 3, 1913, this county turned over to the State Highway Department the location and construction of the Pacific Highway in that county, and raised $500,000 from a bond issue for this purpose. Counties on the Columbia River were the next to feel the effect of the state-wide campaign for good roads. Clatsop, Columbia, Hood River and Multnomah Counties raised altogether $2,335,000 for the construction of the Columbia Highway. On July 26, 1913, the Board of County Commissioners of Multnomah County, under the leadership of its chairman, Rufus C. Holman, appointed an advisory committee to advise them on matters connected with the new departure in modern road building. On September 24 the County Board turned over to the State Highway Department all engineering connected with the Columbia Highway in that county and set aside $75,000 to the order of the State commission for this purpose. An Assistant State Highway Engineer was placed in charge of each of the different units. S. C. Lancaster was Assistant Highway Engineer in charge of the work in Multnomah County. Surveys were made and construction started in October, 1913. Twenty-two and one-half miles of new road have been completed to date at an approximate cost of one million three hundred thousand dollars. This amount includes the cost of



ANOTHER TUNNEL AND BRIDGE

This is on one of the lower grades of the road, about the same level as the railroad. The character of the rock through which cuttings had to be made is apparent.



THE BOWLBY TUNNEL

Here the rocky side of the mountain overhangs the river and the engineers decided the safest road would be through a tunnel. This was so cut that it is lighted naturally by several openings through which wonderful views of the river far below may be seen.



LATOURELL BRIDGE

In the left center background is seen Crown Point. Note the artistic overhead footbridge spanning the highway. The road is well shaded by fine trees along the greater portion of the route.

surveys, grading, building the large reinforced concrete bridges and paving the road with Warrenite pavement for a width of 18 feet.

"Millionaire" Roadmaster John B. Yeon, one of the leading citizens of Multnomah County, gave more than two years of his time free to the public and took active charge of the construction of the roads in his county.

The Columbia Highway in Oregon begins at Seaside, on the Pacific Ocean, in Clatsop County. It parallels the ocean beach for 12 miles and then cuts directly across the marshlands, a distance of 12 miles, to the City of Astoria. From Astoria to the Columbia County line the highway extends 28 miles in this county. On Bugbee Mountain, 23 miles east of Astoria, and overlooking the mouth of the Columbia, the highway runs out of a forest of firs at an elevation of 700 feet to descend 650 feet on a 5 per cent grade along the face of the cliff. The descent is accomplished by four wonderful hairpin curves, and yet the road is so located that a long sight line for the autoist is preserved on each curve. This is unquestionably the grandest feature of the lower section of the highway. From the crest an unbroken view is obtained up and down the river for a distance of nearly 40 miles.

Following the river towards Portland the highway passes through Columbia County for 56 miles, along which course the most attractive scenic section will be the Beaver Valley unit,



THE CHARACTER OF THE ROAD

The road is like this along the whole course of the highway, wide with easy grades and graceful curves, a delight for the motorist and with scenic features unsurpassed by any highway in the world.

on which is located the beautiful Beaver Falls.

In Multnomah County the highway has been practically completed and paved for a distance of 44½ miles east from Portland. At a distance of 23 miles from the city, Crown Point is reached. The road here is carried around the top of a rock cliff at an elevation of 750 feet above the river, on a curve of 110-foot radius. The central angle of the curve is 225 degrees. On the outer edge of the road a 7-foot sidewalk has been built and is protected with a concrete railing 4 feet high.

Latourell Falls is passed at 26 miles and Shepperd's Dell at 27.5 miles. Bridal Veil Falls is one mile farther and Gordon Falls or Waukena (most beautiful) Falls in Benson Park are 31.5 miles from Portland. Multnomah Falls, the largest and grandest of the ten waterfalls encountered in this county, are a mile beyond Waukena Falls. A large park of four hundred acres, including the best of the falls and the most rugged of the landscape, was purchased and presented to the public as a gift by Mr. S. Benson, of Portland.



McCORD CREEK BRIDGE

Type of artistic construction of bridges along the Columbia River highway which is so in keeping with the wonderful natural scenic features so numerous along the entire route.



THE APPROACH TO A TUNNEL

The difficulty of the construction at a point like this was solved in the manner so vividly indicated by the photograph.

Another point of especial interest is the Oneonta Gorge and Tunnel two miles from Multnomah Falls. The highway crosses the stream on a reinforced concrete bridge and passes immediately into a tunnel 125 feet in length. The height of the rock cliff is 205 feet, the railroad is close to the face of the cliff and the river is next to the railroad so that a tunnel was the only solution of the problem.

Horsetail Falls are a few hundred yards farther and 40.0 miles out from Portland the scenic three-hinged arch bridge over Moffet Creek is crossed.

Twenty miles more the Bowlby Tunnel is entered and the city of Hood River is five miles farther east. Pendleton, the home of the "Round-up," is the eastern terminus of the Columbia Highway, distant from Seaside 363 miles. A variation of rainfall of unusual degree is found on this highway. At Astoria, nearly a hundred inches per year is the average; at Portland, forty-two inches; while at Cascade Locks the precipitation is seventy-seven inches; and sixty miles farther east it is fifteen inches per year.

In Hood River County the gorge of the Columbia widens out again above the Cascades, where is to be seen some of the grandest and most rugged scenery in the world. At one point five miles west of Hood River City it was found that the most economical construction would be a tunnel through solid rock for a distance of 400 feet. To have built over the point of rock using the maximum grade of 5 per cent would have required an additional mile of road. The state appropriated $50,000 to construct this section of the highway, 4,500 feet in length. Topographical condi-

tions were right for a tunnel with windows cut out to the face of the rock cliff. A 200-foot viaduct of reinforced concrete was planned for the west approach. The tunnel portal at this end is short, the highway entering the face of a rocky nose. At the east end the portal excavation is more than 100 feet long. There are five windows in the tunnel, each window being approximately 20 feet long and 19 feet high. The tunnel section is



HORSETAIL FALLS

One of the many beautiful waterfalls along the course of the highway bearing, however, anything but a romantic name, so freely given similar falls.

18 feet wide and 19 feet high. The tunnel required very careful work on the part of the contractor, the specifications providing a bonus for carefulness in excavating the tunnel and window sections. The tunnel cost complete $14,472.85, its actual length is 390 feet, giving a cost per lineal foot of $37.10. This tunnel, it is claimed, excels the Axenstrasse on Lake Lucerne in Switzerland. The windows are protected by concrete railings and are recessed to provide ample room for tourists to stand and view the Columbia River a hundred and fifty feet below and the rugged shores of Washington on the opposite side.

Hood River County voted a $75,000 bond issue which was used in grading six and one-half miles of the highway in places where no road existed. The completion of these sections made it possible to open the Columbia Highway to traffic in August, 1915.

TROPICAL FORESTRY AT YALE

An important development in forest education is marked by the recent announcement that after the first of next July research and instruction in tropical forestry will become an established part of the work of the Yale School of Forestry. The step is significant both of the importance of tropical forests and of the part which this country may be expected to play in guiding their development.

With the gradual exhaustion of the timber resources of the temperate regions, the growing investment of American capital in the tropics, and the improved sanitation of such countries, tropical forests are unquestionably destined to become of constantly increasing importance. The need for thorough study of tropical forests and for the education of professional foresters for work in the tropics is therefore obvious, particularly when it is remembered that the few schools which now exist in the tropics, particularly in British India and the Philippines, are either local in character or devoted to the training of the lower grades of forest personnel.

Tropical forestry is an almost untouched field. Although tropical forests are vast in extent and one of the foremost resources of tropical regions, comparatively little is known even of their composition and practically nothing as to the best methods of handling them. Their organization, utilization, and development are consequently bound to receive much attention during the next half century. In this the United States should play an important part, particularly in the training of professional foresters upon whom will devolve the important task of developing forestry in the tropics. American forestry methods have already been accepted by several far eastern countries as the type best fitted to their conditions. Foresters trained in this country and with experience in the Philippines have been selected by the English to organize and take charge of forestry work in Borneo, and by the Dutch for similar work in Sumatra; while China has recently appointed a graduate of Yale as forestry adviser and co-director of its forest service.

The action of the University in making instruction in tropical forestry one of the activities of the Yale School of Forestry makes it certain that Yale will play an important part in training men for professional work in the tropics and in helping to formulate the forest policies for tropical regions. No announcement has yet been made regarding the organization of the work in tropical forestry or the personnel under which it will be conducted. Such research and investigation as is undertaken will, however, in all probability be concerned chiefly with tropical dendrology and silviculture; technical properties and uses of tropical forest products; and trade information and methods of forest exploitation. Present plans, it is understood, contemplate making the School of Forestry the center for information on tropical forestry, and particularly on Central and South America.

It is estimated that there is enough waste from the sawmills of the South alone to produce twenty thousand tons of paper a day.

Forestry and the Public Health

By Henry Reed Hopkins, M. D.

Former President Medical Society of New York

TO Americans no subject is of more vital importance than that of forestry. Without our forests the fertility of our soil, the profits of our farms and gardens, the building, the operating, the profits of our railroads, the operations of our mines of coal and iron, the building and the maintenance of our homes, our industries, in fact, our civilization disappears, and what the traveler now sees in many parts of the old world in Palestine, Greece, Northern Africa, Northern China, and Central India will be seen on the plains of America.

Our minds may possibly open to a more proper valuation of this matter as we recall the past rapid growth of our population and then forecast that within a couple of centuries, a brief period in the growth of nations, America should be the home of some 500,000,000 of prosperous, free and independent citizens. We know of no facts more potential in our future possibilities than the facts of the relations of forests to climate, to productiveness of soil, to industries, to the prosperity of nations, to civilization.



DR. HENRY REED HOPKINS

Who urges members of the medical profession to study forestry and tells why forestry is closely allied to health.

We now invite earnest consideration of some of the well-known principles and facts upon which the foregoing inferences and conclusions are predicated. During the last twenty years the problems of forestry in our country have been enthusiastically studied, and the literature is rapidly growing in interest and in scientific value. Some acquaintance with this literature prompts us to call attention to the following data, the groundwork of our opinion as to the timeliness and the fundamental importance of our subject.

First, let our minds enjoy the exercise of a biological excursion; let us recall that our forests are the royal family, the princes and the monarchs of that kingdom which includes all varieties of beautiful plants and flowers, of edible grains and fruits, and that this forest kingdom had possession of the surface of the earth for many millions of years before the appearance upon the earth of man, or of a single specimen of animal life. In fact, during this long period, forests and their kind were preparing the way for animal life—for man. The thought we would chiefly emphasize is that this long and complicated evolutionary development by forests for man's residence upon the earth was in entire harmony with the laws and vital principles of man's nature and possible progress, and that those same laws and vital principles—man's material environment—are here and in operation today and for all time. Neither should we overlook the important biological fact of man's intimate dependence upon the food, oxygen, without which he lives but a few moments, and also that man in his more important metabolic processes is constantly producing large quantities of carbonic acid, a poisonous gas, the presence of which in a certain proportion in the air makes the same unfit to breathe; and we may recall that our forests exhale vast quantities of oxygen and generously absorb like quantities of carbonic acid.

Let us direct our thoughts for a moment to something possibly more plainly practical, more distinctly economic in its significance; we refer to the distressing phenomenon of many of the rivers of America of breaking out into destructive, devastating floods of increasing frequency and severity. The National Conservation Commission, in its report for 1908 and 1909, gives much space to an interesting discussion of this matter of floods. From this we learn that these disasters are steadily and surely

increasing in duration, in frequency and in severity. For instance, we are told that in the year 1900, the losses from floods was some $45,000,000. That this loss steadily grew year by year, until in 1908 it was more than $237,000,000; and we are further told that this annual waste is constantly increasing and will yet increase until care of our forests and reforestation again provides our hills, mountains, and water sheds with that protection which was theirs by nature's provision and which alone prevents floods.

Speaking of water sheds reminds us to call attention to the unusual and interesting topography of the State of New York, the water sheds of which in very fact make it the Empire State. On our northern border from the extreme west to the far east our streams find the way into the Gulf of St. Lawrence; on our eastern slope the Housatonic River empties into the Long Island Sound; the Hudson River into New York Bay; on our southern side the Delaware River into Delaware Bay; the Susquehanna River into Chesapeake Bay; and the Allegheny and Ohio Rivers into the Gulf of Mexico. All of these streams with a southerly direction are subject to more and longer floods; the responsibility of the State of New York is distinctly far-reaching and of wide proportions.

Another destructive feature from want of a proper proportion of forests is denudation—the washing away of the soil itself; the loss from denudation like the loss from floods is enormous every year and these losses are steadily on the increase. The authority last cited gives our yearly loss from denudation as over 270,000,000 tons of dissolved matter and 513,000,000 tons of suspended matter. This total of 783,000,000 tons represents more than 353,000,000 cubic yards of rock substance, or 610,000,000 cubic yards of surface soil. If this erosive action had been concentrated upon the Isthmus of Panama at the time of American occupation, it would have excavated the prism for an eighty-five-foot level canal in about seventy-three days. Space will not permit us to present exhaustively many of the important arguments of this case; the economic value of inland water transportation; the importance of the constant flow of springs and streams; the importance of our large investments for purposes of irrigation; why in so many countries deserts replace civilization; the prevention of droughts and hurricanes; why this matter should have a prominent place in all medical colleges where preventive medicine is properly taught; the proportions of forests to farm lands in various places; each of these is a subject on which interesting paragraphs or chapters could be written.

The purely economic side of the subject alone makes it a matter of transcendent importance. Add to this the relation of forests to business, to the manufacturer, and the arts of civilized life, and the question becomes second to none in supreme and all-embracing significance. And yet we believe that more intelligent consideration will show that a more important relation of the forests to mankind is biological rather than economic—the existence of human life, the perfection of mankind, the prevention of disease; this is the more important side of our subject, the side that should and does appeal to medical men and the side which medical men should intelligently, emphatically, and persistently acclaim.

This dogmatic statement is based upon a consideration of the rôle played by forests in the production of climate and the importance of climate—air, light, humidity, and temperature, the environment of man, the factor of supreme importance in man's existence and welfare.

[Note.—After making the above address at the meeting of the Medical Society of the County of Erie, N. Y., Dr. Hopkins presented the resolution accompanying this article.]

RESOLUTION ASKING MEDICAL SOCIETIES TO URGE A STUDY OF FORESTRY

Resolved, That the Medical Society of the County of Erie, State of New York, hereby makes record of its conviction that to Americans the subject of forestry is a matter of enormous vital significance; that to the medical profession of America the subject should appeal as to no other group of our citizens; that record should be made and repeated by medical societies, county, State and National, urging upon those in authority the importance of the most intelligent study of this question of forestry to the end that suitable action by our governments, State and National, be taken in this our most vital problem. And be it

Resolved, That these resolutions be transmitted under the seal of this society to the Medical Society of the State of New York, with the request that the same receive due consideration, and if approved that the matter be brought to the attention of the American Medical Association at its next meeting.

[The above resolution was presented by the Committee on Public Health to the Medical Society of the County of Erie, N. Y., and passed at its last meeting.]

SAVING DAMAGE TO THE FOREST

THE system of forest fire prevention in use in Vermont has now been given sufficient trial to demonstrate its efficiency, and the results are most encouraging. Not only has a smaller percentage of Vermont's forest area been burned over during the past few years than in adjoining States, but the expense of fire fighting has been relatively less.

The law provides that the expense of fighting forest fires is borne by the town in which it occurs, but if in any one year this expense exceeds 5 per cent of the grand list the balance is paid by the State. In the unorganized towns the State bears the whole expense, since the taxes come to the State. In the year 1908, before the establishment of the Forestry Department, the State of Vermont spent $9,039.32 in this way. During the seven years since the establishment of the department the total cost for this work has been $5,565.15, or an average of $795 a year.

Ornamental and Shade Trees

A Department for the Advice and Instruction of Members of the American Forestry Association

EDITED BY J. J. LEVISON, B.A., M.F.

Arboriculturist Brooklyn Park Department, Author of "Studies of Trees," and Lecturer on Ornamental and Shade Trees, Yale University Forest School

MUNICIPAL PLANTING OF SHADE TREES

IN last month's issue we announced a series of articles on Shade Tree Planting. The first one dealt with planting done by a local community. This month we will consider the advantages of having all street tree planting done by the municipality. It matters little whether the responsibility for the planting and care of street trees is vested in a forester, a department of the city government or in a separate commission, provided the authoritative head has the knowledge and ability, is clothed with sufficient authority and is provided with adequate funds to carry out the work. There really are distinct advantages in having the municipality undertake shade tree planting as against leaving the work to individual or even cooperative effort.

If the city authorities undertake the planting, they can do it uniformly over large areas, they can adhere to one species on the same street, set out the trees at uniform distances apart regardless of individual property lines, and they can have them all of the same size, no matter what the individual desires of the property owners may be. The municipality, planning for a large number of trees at one time, can plant accordingly, select the trees ahead of time, obtain them cheaper than individuals can and possibly grow them in a municipal nursery especially designed for that purpose.

Another advantage of equally great importance lies in the fact that the municipality, in undertaking such work, would be provided with a specially trained man for that purpose. He would be either a representative of the local park department or a city forester with an independent office. In either case, he would be the man who, by virtue of his special training and experience, would be fitted to plan for the work at the proper time, select the trees in the most advantageous manner and see to the detail of planting and after-care. With his experience and concentrated attention, he would of necessity obtain better results than any layman could.

In establishing a municipal nursery, this man could grow trees at a very small cost to the city. These trees, moreover, growing in close proximity to their permanent locations, would be better suited for transplanting under local conditions, and would avoid the usual losses resulting from transportation and change of soil and atmospheric conditions, which would, more or less, be the case with trees purchased in other localities.



A STRIKING COMPARISON

This picture shows the effect of uniform, municipal planting on one side, and spasmodic, individual planting on the other. Pin oaks on the left and maples, etc., on the right at Flushing, N. Y.

After the trees have been planted, they must be watered, guarded against mechanical injury, insects and disease, and very often they must be fed. The trained forester representing the city would be better fitted than the individual citizen to know these needs, and apply the necessary cure.

From the foregoing it is evident that the planting of shade trees as a municipal undertaking is the best method, and deserves the careful consideration of all city authorities as well as of others interested in municipal uplift and economic progress. The planting of shade trees

should be classed as one of the most important of civic duties. It matters little how imposing the architecture of a city is, for unless its lines are softened by the foliage of trees, it lacks in artistic beauty and homelike warmth.

From the financial point of view, the planting of shade trees has much merit. Barren, shadeless streets are not attractive to visitors or home-seekers, so that as a business proposition unplanted streets may be fairly classed with unsanitary conditions or with any other form of slovenly civic housekeeping. Systematic planting of shade trees in the city greatly enhances the value of contiguous property, and always pays in the long run, whether undertaken by the municipality or by the individual.



A MUNICIPAL NURSERY

This nursery at Prospect Park, Brooklyn, is now just one year old. It is expected that with the growth of interest in municipal forests and shade tree planting there will before long be many such nurseries throughout the country.

In subsequent issues we will consider the organization of a suitable shade tree ordinance and some of the details of planting and care.

MOUNT VERNON'S DEVELOPMENT

A. Oakley Smith, who since last August has been city forester at Mount Vernon, N. Y., has tendered his resignation to the shade tree commission. Mr. Smith, who has been the first man to fill the position created by the common council last summer, will leave it to return to private landscape and forestry with his former employer, Ferruccio Vitale. His services, however, will not be entirely lost to the city of Mount Vernon, as the mayor as soon as he learned of Mr. Smith's resignation appointed him a member of the shade tree commission. Mr. Smith has accepted the new appointment. In his letter of resignation, Mr. Smith said:

"Active work on our shade trees was commenced last August, and since then some 2,500 trees have received treatment in the form of pruning, trimming, shaping or cavity work. An accurate tree census is gradually being compiled, and when completed will be a very excellent basis for a working plan of the city, giving the number, species and location of young trees, of thrifty, flourishing trees and the ones which are failing; also the number of trees required for planting vacant spaces and unplanted blocks. No planting will be done by the city this spring on account of lack of funds, but next year when the shade tree commission receives a budget, three or four hundred trees will be planted in various parts of the city.

"Development work of this character is naturally slow, and it will take years to show material improvement in the condition of the trees throughout the entire city. Trees planted today will not be valued as shade trees for five or ten years and the result of money spent of necessity in fighting insects is perceptible only to those watching the trees very carefully from year to year. It has been, however, a source of great satisfaction through these past months to note with what interest and keen appreciation the people of Mount Vernon have taken hold of his very vital problem. At first thought some object to the idea of complete municipal control of the trees, but a few moments' discussion is always sufficient to make clear the practicability and importance of this method of protecting and caring for such a valuable asset as the city's shade trees. A number of features are greatly in our favor in connection with this development. Most important of all is the strong support given by the people of every effort put forth to accomplish our object; next is the fact that the insect problem is not as difficult in Mount Vernon as in many other cities. The city is compact, laid out over a relatively small area and the business and residential sections are well defined, thus making possible consistent management and comparatively rapid improvement. The outlook is very promising, and I have every intention of keeping in touch with the development of this department."

ADVICE FOR MANY HERE

One of our members has asked for expert opinion on a number of conditions, and the answers to his questions contain advice of value to many. His questions and the answers are here given:

Q. I have recently purchased a piece of ground along the Susquehanna River, which I intend to convert into a summer home. I desire to transplant some trees, particularly evergreens, and would greatly appreciate it if you would give me such information as you would be able to concerning the following questions: (*We have appended the answer to each question as it occurs, as a more convenient way of presenting the information*—EDITORS.)

Q. 1. Which do you consider the most satisfactory

evergreen shade tree among the evergreens native to this community? My intention is to plant them in groups, possibly of half a dozen or more trees.

A. The white pine is undoubtedly one of the best evergreen trees you can plant in your section of the country. Hemlock is also a highly satisfactory tree for you to plant.

Q. 2. Which do you consider the most fragrant of the evergreens?

A. *Pinus pungens* is extremely fragrant. The balsam fir is very fragrant, but would not do well as far south as your city. I would therefore consider the white pine and the hemlock the best species for you to choose.

Q. 3. Is the balsam pine native to this community? Personally I do not know of it growing here in its wild state.

A. There is a balsam fir which you undoubtedly have in mind. I do not know of the balsam pine. The balsam fir is native to the Adirondack Mountains section, but not in Pennsylvania.

Q. 4. In transplanting these evergreens my intention is to transplant a large tree having a trunk of possibly four to six inches. I have been advised that the proper way to transplant an evergreen of this size is to have the ground dug out around it one season, all of the roots which extend out cut off, and then permitted to stand until the next season so that small roots would form before being transplanted. I had thought of having the trees dug out in midwinter when the ground is frozen about them and transplanted in that way. Could you suggest what is the better plan and what time of the year the evergreen should be transplanted?

A. Your intention to transplant evergreens with a frozen ball is a method that is commonly used with success. The idea of root pruning the tree beforehand is a good one, though it is not always resorted to, and the tree may be transplanted with a large ball without previous root pruning. The root pruning method is the best, however. If you can arrange to transplant these trees in the spring with balls of soil kept intact by means of canvas covers you will do well to do so. You can get an idea of just how this is done by writing to Messrs. Isaac Hicks & Son, of Westbury, L. I., N. Y., for their catalogues and description of their methods. They specialize in this sort of work. The latter method is the best, and spring is the best time to plant evergreens.

Q. 5. What is the best time of year to transplant the tulip poplar, and how?

A. The tulip tree or poplar can best be transplanted in the early spring. The tulip tree should be transplanted with a ball of soil around the roots, and should have its crown cut in at the time of transplanting.

Q. 6. I intend to cover an embankment with honeysuckle vines. Do you not consider this one of the best vines for decorating embankment alongside of road? And what is the best time of year to transplant these vines?

A. Hall's honeysuckle is one of the best vines for ground cover, both on steep banks and in shady places. Early spring is the best time to transplant them. The Virginia creeper and *vinca minor* are equally as desirable. *Rosa winchuriana* makes an excellent ground cover in sunny positions.

Q. 7. Is there any special suggestion you could give me in regard to transplanting of dogwood—as to manner of doing it and time of year? Is there a distinct flowering and unflowering dogwood tree? I intend to transplant some of the ordinary wild dogwood, but have noticed frequently that some trees do not seem to be bearing any flowers.

A. Transplant dogwood in the early spring and cut in the branches at the time of transplanting. Transplant the tree with a ball of soil.

Q. 8. What is the best time of the year to transplant any kind of trees other than evergreens? Is there a time which is most suitable for all, or do different trees require different methods of transplanting and different times of the year for doing it?

A. Generally speaking, spring is the best time for transplanting deciduous trees.

Q. 9. Part of my ground is thickly overgrown with blackberry and raspberry vines. What is the best way to remove these entirely? Can it be done by cutting them down frequently, or must they be dug out in order to eliminate them?

A. Grubbing out blackberry and raspberry vines is the only method of permanently eliminating them from the premises.

Q. 10. I have on my ground a number of chicken-grape vines. Could you tell me whether it is possible to successfully graft on a chicken-grape vine a cultivated grape vine, for example the Concord?

A. A cultivated grape vine can be successfully grafted on a chicken-grape vine (vitis cordifolia).

Q. 11. Could you refer me to any particular pamphlets or books giving information on the above inquiries?

A. See Professor Bailey's "Encyclopedia"; Prof. Sargent's "Manual of the Trees of North America"; "Trees in Winter," by Blakeslee and Jarvis, and "Studies of Trees," by J. J. Levison.

THE QUESTION OF SPRAYERS

Many of our members will be interested in the following question and answer:

Q. I wish to purchase a spray to be used for trees. Please give me the names of some reliable concerns, where I could obtain one of small size at the most convenient price. Also please give me all the information you can regarding work to be done this year. My farm is in Central New York. D. D. D.

A. I believe that the Hays Spraying Machine will answer your purpose best. It is manufactured by the Hays Pump and Planter Company, Galva, Illinois, and

can be obtained from their New York agents, the E. George Company, 194 Front Street, New York City. Two of their machines are especially suited for your purpose. One is a three horsepower machine, catalogue No. 3112, costing $280, with truck; and the other is a one-and-a-half horsepower machine, catalogue No. 1919, costing $176.67, with truck. Other good machines are the Fitz Henry Guptil, the Domestic, the Bean, the Gould and the Deyo Macey. You will need oil emulsions to spray the trees in March and Bordeaux mixture and arsenate of lead for later spraying. Interstate Chemical Company, 12 Bayview Avenue, Jersey City, N. J., will supply those. Other good firms are The Vreeland Chemical Company, 50 Church Street, New York City; Pratt & Co., of the same address; The Graselli Chemical Company and the Sherwin Williams Company, of New York City. You will have to spray your orchard in March with lime sulphur wash and the Bordeaux mixture and arsenate of lead will have to be applied after blossoming. It is wise to have the trees inspected to determine the exact nature of the insects before recommending specific treatments.

QUESTIONS AND ANSWERS

Q. My rhododendrons have died this spring in large numbers. Can you account for it, and tell me what to do?

C. K., *Wilkes-Barre, Pa.*

A. This winter has been a very hard one on rhododendrons and many of the exotic evergreens. We have seen hundreds of rhododendrons winter-killed early this spring; but a close examination will show that they are profusely sprouting from the base and lower branches. All you need to do is to cut off the dead branches and let the new ones come up.

Q. My hickories are dying in large numbers. Can you tell me what to do? J. M., *Tarrytown, N. Y.*

A. Judging from your statement that your hickories are dying in large numbers, and that they are located in the vicinity of New York, I presume that they have been injured by the hickory bark beetle, an insect which has destroyed thousands of hickories in your vicinity. A close examination of your trees will show sawdust on the outer bark and many beetles ready to emerge on the inner bark. We fear it is too late to cut the infested trees down; but would suggest a careful examination of all the hickory trees during the fall before the leaves drop, and would advise you to mark the infested ones and have them removed and burned before the following spring.

Q. My horse chestnuts are turning brown.

M. L., *Syracuse, N. Y.*

A. It is very characteristic for horse chestnuts to turn brown prematurely. It is due to a fungous blight, and it would be impractical to apply any special form of attention except frequent watering during the hot summer months.

Q. Two of my elms are bleeding profusely, producing a white, slimy flow of sap. Will you kindly tell me what to do?

R. H. *Stamford, Conn.*

A. We assume that your elms are suffering from a disease known as slime flux, caused by little mites. It is very difficult to control this flow of sap, and can only advise you to keep the wound clean, cover the exposed part with coal tar, and if this does not stop the flow of sap, burn out very carefully the exposed area and tar it.

Q. I am sending you two photos of a honey locust of mine that split in two the past winter. As it stands the tree that is left is six feet in circumference. The hole goes well down into the root. Because it is still a handsome tree I am anxious to preserve it and shall greatly appreciate your suggestions.

S. B. S., *Setauket, L. I., N. Y.*

A. Remove all broken parts and by means of chisel and gouge, smooth the exposed wood in such manner as to drain the water and leave no crevices for the accumulation of moisture. After the surface has been smoothed, apply a coat of creosote and another coat of coal tar. It is also necessary to have the edges of the wound cut perfectly smooth, and it would be wise in the fall to trim the top of the crown with the object of lessening the weight of the tree, in order to enable the weakened trunk to support it. A honey locust will respond very readily to severe trimming.

Q. I am sending a couple of twigs taken from a Silver maple. I have several of these on my lawn and they are fairly well covered with these parasites, or whatever they may be, and I would like to know how to treat them, and would be pleased if you could give me a prompt reply. I have also some apple, pear and plum trees and I notice in the crotches of some of the limbs nests of some very small caterpillars. What is the best way to get rid of these? W. T. T., *Utica, N. Y.*

A. The soft maple leaves show a bad infestation of what we know as the bladder maple gall, a deformity which is sometimes very abundant on small trees, in particular. It is caused by an extremely small plant mite. Ordinarily there is not enough injury to warrant treatment, though should the trees from which your samples were removed appear to justify it, I would suggest spraying in the early spring before the buds have started, with a lime-sulphur wash; any of the standard commercial preparations diluted approximately 1 to 8, such as for San Jose scale. This should prove fairly effective in checking the mites.

As to the caterpillars in the apple and other trees, I assume that they are apple tent caterpillars, and if so, would suggest that you apply kerosene to the webs and caterpillars, early in the morning or late in the afternoon. The kerosene may be applied on a sponge or cloth attached to a stick, and it need not be lighted.

Q. A soft maple tree about fifteen feet high was transplanted two months ago from natural situation in the woods, and was found to contain several decayed spots where branches had been broken off; these were drilled out and filled with cement; the tree leafed out finely, but leaves were attacked by a rust insect; leaves are badly eaten away but still seem vigorous. Shall appreciate your advice. W. B. C., *Oakmont, Pa.*

A. The answer given to "W. T. T., *Utica, N. Y.*," in the preceding paragraphs doubtless explains the maple rust to which you refer, and the same treatment should apply.

Q. I have had remarkable luck in transplanting about two hundred White pine trees from the woods—they have thrived and some are now about ten years old. They are quite bushy at the bottom and I want to trim those lower branches off, both for protection from fire and to beautify the trees, and would like to know when would be the best time to do this, and also at about what age it would be best for the tree.

C. S. B., *New York.*

A. It is perfectly all right to trim these lower branches at any time from now on, though during the fall would be best of all. Cutting off the lower branches will help to keep out fire and will produce better timber but will not enhance the beauty to any extent. It is best to trim the branches gradually, extending over a period of years rather than doing it all at once. Therefore, the earlier the work is begun, the better.

Q. Could you kindly inform me as to what sort of an insect this is on the elms and what to do for the same? Am sending the leaves in another box. W. M. S., *Milbrook, N. Y.*

A. The specimens of elm leaves which you send in show they have been eaten by the larvae of the elm leaf beetle. The remedy is to spray the under side of elm leaves at this season with arsenate of lead in solution at the rate of one pound to ten gallons of water. The elm leaf beetle spends its winter in beetle form. In May, the beetles emerge from their winter quarters and feed on the leaves. Their injury results in holes right through the leaves. The beetles then deposit eggs and the larvae soon hatch from these eggs. These larvae, or caterpillars, feed on the under side of the leaves only and produce the lace-like effect shown on the leaves you sent me. In early August the larvae will change into dormant yellowish pupae and in this process they can be found lying about the base of the elm tree in large numbers. All one needs to do at that time is to collect these pupae and destroy them, or pour some hot water on them. Few persons know about this stage of the elm leaf beetle and this means of destroying them is therefore seldom used.

ADVICE ABOUT TREES FOR JULY

This is the month when most of one's attention should be given to spraying for insects, watering and cultivating.

1. Spray fruit trees with Bordo-lead.

2. Spray elms for elm leaf beetle with arsenate of lead, one pound to ten gallons of water.

3. Spray for forest tent caterpillars with arsenate of lead, one pound to ten gallons of water.

4. Spray tussock moth and other leaf-eating insects with arsenate of lead, one pound to ten gallons of water.

5. Examine the under side of beech trees, and if wooly aphis is present, spray with whale oil soap, one pound to ten gallons of water.

6. Examine evergreens, especially prostrate junipers, box, yew, etc., for red spider, and if necessary spray with whale oil soap, one pound to ten gallons of water.

7. Examine sycamore trees for sycamore blight (gleosporium nervesequum) which produces a white, woolly mass on the under side of the leaves and causes them to curl and wilt. If this disease is present, spray with Bordeaux mixture, one pound to eight gallons of water. The disease is now common in the vicinity of New York City.

8. The black locusts are now being injured in the vicinity of New York City by the locust miner, a small beetle feeding on the leaves. Where this insect is present, and where the tree is of special ornamental value, spray with arsnate of lead, one pound to ten gallons of water.

9. Examine the peach trees for leaf curl, and watch all the other trees for some insect infestation, because this is a month when the insects most commonly appear. If you discover something new, unknown to you, write for information.

10. Trim shrubs after flowering. Do not destroy the natural, drooping effects of the shrubs, but confine yourself principally to dead and old wood and superfluous branches.

THE G-TREES OF BILOXI

IN the vicinity of Biloxi, Mississippi, are several groups of pine trees, which, because of their very unusual shape, have been christened G-Trees. Prof. S. M. Tracy, the well-known agrostologist, whose home is on Treasure Point, near Biloxi, discovered these peculiar trees and has described them on several occasions.

The accompanying photograph illustrates the general character of growth. That it is not a freak caused by the breaking over and continued growth towards the light, of an individual tree, is indicated by the fact that there are a considerable number of trees in different groups, all of which have developed the same peculiar shape. The same form is also found in very small trees as well as in larger ones, such as the one shown in the picture. This growth is confined entirely to pine trees and, as far as known, has never been discovered except in the neighborhood of Biloxi. No scientist has been found who is able to explain this freak growth.



A G-TREE OF BILOXI

These Mississippi pines are famous for their peculiar shape, there are a number of them and no scientist has yet been able to explain their freak growth.

RAILROAD IS REFORESTING

A REFORESTATION and tree conservation work was inaugurated by the Chicago, Burlington & Quincy Railroad Company in 1906, at which time 72,000 seedlings were planted on the property of the railroad at Pacific Junction, Iowa. Since that time the number of trees in this grove has been increased and they now number 107,000. The thousands of others have been planted in different sections throughout Illinois, Iowa and Missouri. It has been planned to extend the work into Nebraska, and of the 50,000 seedlings now at Gladstone a large number will be planted in that State. The catalpa tree originally was a native of the Wabash River Valley. It is easy to work and will last from thirty to fifty years when used for posts or in other exposed situations.

The Saman or Rain Tree

WHENEVER there is an unusual drought in the United States, paragraphs go the rounds in a number of papers describing a most wonderful tree growing in the forests of Peru that is said to possess the remarkable property of absorbing the moisture from the air and subsequently pouring it forth from its leaves and branches in the form of rain. Other stories have it that during the day the tree takes up a great deal of water from the earth by means of the roots, and that during the night it is again given off profusely through the leaves in drops of rain, says the *Pan-American Union*. Some of the numerous stories which have been written and published about this tree state that travelers in tropical America never pitch their tents under it on account of the profuse dripping of water transpired by the leaves during the night in such quantities that in many cases the surrounding soil is converted into a veritable bog. It is said to possess this singular power to a much greater degree during the hot, dry weather, when the rivers are at their lowest and the water most scarce. Accounts similar to these are doubtless familiar to many. The appearance of such articles in the papers is soon followed by a number of recommendations and suggestions to the Federal and State governments that the experiment of the culture of this remarkable tree in the more arid parts of the country should be conducted with a view to the benefit of agriculture.

It is truly remarkable what a number of credulous people who have read such exaggerated statements about the water-transpiring qualities of the so-called Peruvian rain tree have conceived the idea that it would be a suitable tree to plant in the arid Southwest, where droughts are so common. It is true that the rain tree grows in semiarid conditions in certain parts of Colombia and Peru, but this does not argue that it would grow in New Mexico and Arizona and that it would supply moisture enough to grow crops in the vicinity of such plantations. The truth of the matter is that this tree does not transpire any more water than other trees with similar leaf surfaces. It is difficult to say how this legend ever originated. Some venture the conjecture that it may have arisen from the fact that the crown of the rain tree is open and the sun always shines through it to the ground, so that the grass and some farm crops grow underneath it almost as freely as in the open. This is a fact which does not obtain in the case of other tropical trees.



Courtesy of the Pan-American Union.

A PICTURESQUE SAMAN TREE (ALSO CALLED THE RAIN TREE) GROWING IN TRINIDAD, BRITISH WEST INDIES

This is the tree which popular fancy believes has the faculty of absorbing moisture from the air and subsequently pouring it forth from its leaves and branches in the form of rain. It is a magnificent tree, grows rapidly, and is indifferent to soil, thriving from sea level to 2,000 feet elevation, and accommodating itself to dry as well as wet locations. In Trinidad it reaches a height of over 80 feet, with wide-spreading branches covering an area of 150 feet in diameter.

A very interesting and plausible explanation of this legend was published by Mr. W. T. Thiselton Dyer in *Nature* of February 28, 1878, when he stated on the authority of Dr. Spruce, the celebrated botanist, who spent many years in South America, that the tamiacaspi, as it is called by the Indians in eastern Peru, is not a myth, but a fact, although not exactly in the way popular rumor has presented it. He said that an examination of the tree from which water is noticed to drop shows a multitude of cicades sucking the juices from the ultimate twigs and leaves and squirting forth slender streams of limpid fluid. This is, however, a rare occurrence, and is not confined to the rain tree, but is true also of the cabbage tree *Andria inermis* and a good many other leguminous trees in tropical South America.

Aside from this legend, the tree is an interesting one from other points of view. There is no other tree in tropical America about which there is so much curious information as the rain tree, and everyone who visits the region of its growth alludes to it as one of the most wonderful trees. It is a very conspicuous feature of the tropical American landscape. One of its chief characteristics is the extraordinary large size of its crown, which often covers fully half an acre of ground. Another feature which distinguishes it from practically every one of its associates is that it has all its leaves on the small twigs at the extreme ends of the branches. All the leaves are thus exposed to the direct rays of the sun.

To the traveler in the northern part of South America, saman is the most familiar name for this tree, and to the general reader it is known chiefly as the Peruvian rain tree. Botanists call it *Pithecolobium saman*. The English-speaking people of tropical America call it also South American acacia, zamang tree, giant thibet-tree, or genisaro. In Martinique it is known as arbre a la pluie, in Dutch Guiana as regenboom, and in Brazil as arvore de chuva. The tree is widely distributed throughout the tropical part of the world, and a great many other local names have been given to it in different regions of its growth. It is found naturally in Colombia, Venezuela, the Guianas, Brazil, and Trinidad, but its artificial range has been extended to all the islands of the West Indies, where it now forms in many parts a very important part of the tree flora. In Jamaica it constitutes a useful fodder plant. In fact, it may seem strange to say that cattle have been the means of introducing the saman tree into Jamaica. This island was formerly dependent for cattle upon Venezuela, and the food of the animals during their voyage consisted, among other things, of the pulpy legumes of the saman tree. The seeds, being hard, were uninjured by the process of mastication and digestion. The seeds were dejected by the animals in the pastures, where they germinated and grew up into large trees. The process of passing through the animals softened the seeds and hastened the period of germination. In this instance we have cattle as not only the means of introducing the seeds of this valuable tree, but also involuntarily instrumental in establishing the tree in a new country. One acquainted with the saman tree can easily realize its value as a shade and food tree for cattle.

This familiar tropical tree stands pre-eminent as a shade tree for general purposes, and especially for public roads. It grows rapidly and is indifferent as to soil, thriving from sea level to 2,000 feet elevation, and accommodating itself to dry as well as to wet locations. In Trinidad it reaches a height of over 80 feet, with widespreading branches covering an area of 150 feet in diameter. The wood is moderately heavy and about equal to sabicu, a closely related tree growing in the West Indies. It is suitable for building purposes and for making furniture and cabinet work.

A CHANCE TO HELP BIRDS, TREES AND PARKS

HOW THE BIRDS HELP THE TREES

1. Caterpillars, beetles, borers and sucking insects are destroying our trees and shrubs. From 76 per cent of the food of the blue bird, 90 per cent of the food of the oriole to 98 per cent of the food of the wren, consists of injurious insects.

2. A pair of scarlet tanagers, working one hour a day for a week will devour 14,000 caterpillars and thus save the foliage of two average trees.

3. The chickadee eats insects and spiders' eggs in the summer; weed seed in the winter. One chickadee will devour on an average 30 canker worm moths a day from the 20th of March to the 15th of April. If the average number of eggs laid by one female is 185, one chickadee would thus destroy in one day 5,550 eggs; and in the 25 days in which the canker worm moths crawl up the trees, a chickadee would destroy 138,750 eggs.

4. Sparrows, finches, doves destroy millions of tons of weed seed. In Utah, the tree sparrows destroy 815 tons of weed seed in a season.

5.. A pair of native sparrows will destroy 3,360 caterpillars per week for the family supply. They have been reported to have carried to the nest 500 insects in an hour.

HOW THE PARK DEPARTMENT HELPS THE BIRDS

1. Trees and shrubs furnishing food for the birds have been planted in large numbers.

2. The habits of useful birds have been studied and suitable houses and feeding stations have been put up for them. The boys of the Manual Training High School are making some of these bird houses.

3. Grain, suet, and other food for birds are placed at their disposal.

4. The enemies of birds, such as cats and English sparrows, are kept out of the parks so far as possible.

HOW YOU CAN HELP THE BIRDS, THE TREES AND THE PARK DEPARTMENT

1. You can help to preserve the shrubs and trees upon which the birds feed.

2. You can help to preserve the bird houses and feeding stations.

3. You can donate bird houses, suet boxes and feeding stations, and can encourage the city tree-planting movement.

[This is a copy of a placard prepared by the Brooklyn Park Department for an exhibit.]

Forestry for Boys and Girls

by Bristow Adams

FORESTS AND FISHING

THE boys and I went fishing a few days ago. We really started to work in the garden, but the worms which we dug up were so good and plump that they had much to do with calling us away from the job. It was a pretty hot day anyhow, and we knew it would be more pleasant in the shade of the hemlocks and ash trees along the creek than it was in the unshaded garden.

A convenient tin can soon held a plentiful supply of angle worms, and it wasn't long before we gathered together hooks and lines and started off. Fortunately our house is not far from the creek, which flows through a deep gorge not more than a stone's throw away. Just above and just below us the water tumbles over the rocks in beautiful falls, and the sound of these is constantly in our ears. Of course, we are used to it, but when other folks come to visit us, and especially when they are so good as to stay over night, the sound of the falls makes them think that it has been raining all night long, and they are surprised in the morning when everything is bright and dry.

Not far above us there is a dam which makes a fair-sized lake or pond, and just above this the water runs still and deep. Here we can clamber down to the creek, bait our lines, and if we are lucky can catch enough bass for dinner.

It was not long before we had our lines in, and were waiting with as much patience as we could muster for the much-desired "bites." It was very cool and quiet where we were. We could look over to the State road and see the farm teams creeping past and automobiles whizzing along, leaving trails of heat and dust behind them. We thought we were a great deal better off than they were, and we had ceased to worry about the garden.

Pretty soon the oldest boy got a bite, but he was not quick enough to hook the fish, and he rebaited his hook and set himself to waiting again. We then got to talking about fish and how long they lived, and whether they could hear, and how they could breathe under water; so, of course, I had to tell them the best I knew about it.

Then we got to talking about the effect of forests on the life of the fishes, and how the very best and gamiest of our inland water fish must have cool, clear water; how trout that once thrived in streams, which were shaded over by the trees, disappeared when the trees were cut away and the streams were left open to the sunlight. Not only that, but the roots of the trees form a filter which lets the rain fall through gently without washing in any fine particles of silt to make the stream muddy. For the brook trout thrives best only in clear water which runs over pebbly bottoms rather than over mud.

From that we got to talking about the use of forests to the fish, and we saw how the fishing was best where the forest was protected, and how forest fires had destroyed many fine fishing streams, and how even the anglers, who cut away the willows and brush from the banks of little streams in order that their lines and fishing flies would not get tangled, had really brought about a greater harm by opening up the streams to full sunlight and taking away the coolness of the water.

The boys got me to talking about the trout fishing in the upper Pecos River, where it rises in the northern part of New Mexico in the midst of the Pecos National Forest; of fishing in the streams of the middle part region of Colorado where the State helps to protect the fish and will not allow lumber driving, which digs up and tears out the streams beds; and best of all, of the "Dolly Varden" and rainboe trout in the McCloud River in California where it flows down from the glaciers on the side of Mount Shasta. I told them how the Dolly Varden would not rise to the fly, but how it fought when once hooked with a bait of salmon eggs, for it has cannibal tendencies. The rainbow trout readily rises to the fly, but it is easier to land.

ABOUT this time the smallest boy brought in a bass, and then there arose a dispute as to who should measure him, for according to the State law those which are not up to standard length have to be put back. One of the boys claimed that because he caught it, it was his right to measure it. The other one used the same asis for his argument that since he hadn't caught it, he ought to measure it. After it was settled by having one hold the bass while the other held the little steel folding rule, the bass was found to be too short and was put back in the water, diving down with what the youngest said was a last "wink" with his tail.

For a long time there were no more bites until finally I got a fish, which was of legal age and size. We counted on taking him home in triumph. But it was like the largest fish which always gets away, only it got away in a new and unexpected manner. We were keeping it alive in a large pail to show to mother and sisters at home, and I had just spoken of the fact that the sun was getting low, and that it must surely be near supper time, when the youngest went to the edge of the water and poured fish-and-all into the stream. His explanation seemed perfectly good, to him at least, for he said that he had put it back so the oldest could catch one; that he and father had each had a chance.

Needless to say, nobody caught any more, and we went home empty-handed and were met with jeers at being such poor fishermen, and with the further very true statement that if we had stayed home we would at least have had the garden all dug up.

YET I felt that the time had not been lost after all; that we had learned how the fish were dependent on the forests for pure, clear water and right living conditions. We had reviewed all of the ways that injury to the forests had hurt the fish. At one extreme, for example, are the terribly devastating fires like the great Miramichi fire of 1825 in New Brunswick, which burned along eighty miles of the Miramichi River in a belt that was twenty-five-miles wide. Those who saw the place afterwards said that the fish were found dead in heaps on the river banks. At the other extreme, possibly, is the cutting away of the brush from the banks and headwaters of the little trout brooks by those fishermen who think only of their comfort for the present, and not of the good of the fisherman who may be there after them. We had spoken of how impurities which came into the streams from factories and cities destroyed all except the poorest sorts of fish; and we realized one more way in which forests may be useful to man and may help in his pleasure and recreation.

County, City, Town and School Forests

By J. W. Toumey *Director of the Yale Forest School*

ALTHOUGH the public ownership of forests by the nation and State are the most prominent features in our forest policy, the ownership of forest property by lesser governmental units is becoming important. County forests, city forests, town forests, school forests and the like seem novel to most of us, yet this kind of forest ownership is wonderfully successful and is the dominant ownership in some countries of Europe. Thus in Switzerland about 72 per cent of the total area of the forests of the republic is owned by these lesser governmental units and is known as communal forests. A considerable percentage of the forests of Germany and Austria are of the same kind. In fact, all the countries of Europe have these three classes of public forests, namely, national, State and communal, but in different amounts and in varying proportions.

Almost unknown to the general public and for the most part within comparatively recent years, counties, cities and towns in the United States have been acquiring land through purchase or gift, which must be regarded as communal forests. Although these areas have been acquired for the most part for the purpose of protecting the watersheds from which potable water is obtained or for purposes of recreation, sometime timber reproduction will join hands with water protection and recreation. They are located near centers of population where intensive forest management is possible. Our so-called woodland parks, some of which are 1,000 acres or more in extent should be recognized as county, city or town forests and developed from the point of view of aesthetics and wood production combined, as is now the case with similar forests in Europe.

Without exception publicly owned watersheds protecting potable water supplies should be recognized also as county, city or town forests, as the case may be. Their organization for the production of forest products, is the only important economic use which the land can serve. Accepting this viewpoint, which it seems to me is the only sound one, let us inquire into the present situation relating to them in this country.

The available data for an inquiry of this nature is very fragmentary. Almost unknown to the public, however, and without propaganda to stimulate public opinion favorable to communal forests, the acquiring of lands for such purposes has gone forward with considerable rapidity, particularly in the most populous and the older settled parts of the country. Within the past year I have attempted to gather what information I could regarding forest property owned by these lesser governmental units, which under our interpretation may be called communal forests. The data regarding some States is fairly complete, while regarding others it is extremely fragmentary. The following table represents the conditions in several States from which I have been able to obtain fairly reliable data. Conditions which parallel these very likely prevail in other States, even in the States listed regarding which the data is not complete.

State	*Location*	*Character*	*Area in acres*
Connecticut	Bethel	Watershed forest	125
	Bridgeport	Woodland park	50
	Danbury	Watershed forest	75
	Hartford	Woodland park	413
	Hartford	Watershed forest	4,345
	Meriden	Woodland park	1,000
	Middletown	Watershed forest	684
	New Britain	Watershed forest	2,713
	New Haven	Woodland park	550
	Norwich	Watershed forest	369
	Wallingford	Watershed forest	497
	Waterbury	Watershed forest	1,000
	Waterbury	Woodland park	70
	Winsted	Watershed forest	250
Massachusetts	Boston	Watershed forest	1,000
	Milford		150
	North Adams		800
	Pittsfield		1,600
	Fitchburg		600
	Holyoke		2,000
	Westfield		1,200
	Fall River		3,000
New Jersey	Atlantic City	Watershed forest	2,000
	Bridgeton	Woodland park	250
	East Orange	Watershed forest	800
	Park Com.	Woodland park	3,365
	Newark	Watershed forest	22,851
North Carolina	Asheville	Watershed forest	17,000
	Bryson City	Watershed forest	196
	Brevard	Watershed forest	216
	Canton	Watershed forest	220
	Lenoir	Watershed forest	240
	Marion	Watershed forest	628
	Murphy	Watershed forest	600
	Saluda	Watershed forest	130
	Tryon	Watershed forest	660
	Waynesville	Watershed forest	900
	Weaverville	Watershed forest	330
	Winston-Salem	Watershed forest	600
Maryland	Baltimore	Watershed forest	3,000
California	San Diego	Watershed forest	7,000
Ohio	Cincinnati	Watershed forest	1,500
	Cleveland	Forest, a part of municipal farm	100
	Oberlin	Woodland park	100
Utah	Ogden	Watershed forest	2,155
	Manti	Watershed forest	1,900
	Salt Lake City	Watershed forest	25,000
Virginia	Lynchburg	Watershed forest	7,000
	Staunton	Watershed forest	5,000
New Hampshire	Newington	Town forest	200
	Keene	Town forest	1,800
	Manchester	Watershed	1,800
	Franklin	Town forest	155
	Concord	Watershed	400
	Newbury		250
	Nashua		50
	Littleton		40
	Hanover and Dartmouth College		1,000
	Easton		100
	Milan		100
	Richmond		100
	Jeffrey		500
	Gilsum		76

This partial list of the woodland parks, forests protecting the potable water supply, and other areas of potential forest land owned and managed by small governmental units in ten States gives a total area of over 130,000 acres. Although their organization for the production of forest products has scarcely begun, their location near large centers of population where all classes of forest products are high makes intensive forest management possible. I believe we can look forward to the growing importance of these forests not only for the protection which they afford and their use for recreation but also for production of timber. It is my belief that when complete data of all the communal forests in this country are available there will be over 250,000 acres. The following brief descriptions are taken from information received through correspondence.

Hartford, Conn., owns 4,345 acres of watershed forests which protect her potable water supply. A working plan has been made for the property and systematic planting has been in progress during the past fifteen years. Improvement thinnings have been made and considerable mature and diseased hardwoods removed. Good roads have been constructed and other work accomplished looking towards the orderly development of the property for the production of timber as well as for purposes of protection and recreation.

Cincinnati, Ohio, owns a municipal forest of 1,500 acres, which consists chiefly of old fields with pronounced topographic features. At present it comprises an aggregation of farms of which about 25 per cent is in forest, mostly culled or severely injured by grazing. These forests are being managed as selection forests since the growth is largely all-aged classes. Reforestation has been begun and will play an important rôle in the development of the property since 75 per cent is open or denuded land. During the past two years approximately 150 acres have been reforested. The object of municipal ownership and management is for the protection of potable water supply, for recreation purposes, and for the production of wood.

Oberlin, Ohio, owns 110 acres. The area now covered with timber is managed as a selection forest. Reforestation of the open fields was begun ten years ago.

Lynchburg, Va., owns about 7,000 acres of land situated northwest of the city in the Blue Ridge. The city keeps one man employed there constantly and another at times to guard against trespass and fire. The city has not as yet attempted any planting or improvement cutting.

Staunton, Va., owns about 5,000 acres of mountain land, from which it obtains its water. The property is situated south of the city on the northwest slope of the Blue Ridge. It is mostly cut-over land and no attempt has yet been made to improve it.

The city of Newark, N. J., owns approximately 22,851 acres on the upper waters of the Pequannoch in Morris and Passaic counties. A large part of the tract is farm land which has been depopulated to prevent contamination of the water. Six or seven years ago some plantations were made under the direction of the State forester and at various times since some young trees have been planted. It is probable that this tract will ultimately become forested, but little has as yet been done looking toward its orderly development for the production of forest crops.

Essex County Park Commission, New Jersey, owns 3,365 acres, of which 2,050 acres are forested with hardwoods. Improvement thinnings are made from time to time, though chiefly with the view to scenic effects.

East Orange, N. J., owns 800 acres. About 400 acres are forests, and planting is in progress upon about 200 acres. A forest nursery is maintained, also some improvement fellings are carried on in the older stands.

Atlantic City, N. J., owns about 2,000 acres in Atlantic County, but the property is scarcely accorded fire protection.

Asheville, N. C., owns 1,700 acres, which embrace the entire watershed from which the potable water supply is obtained. It is patrolled to prevent fire and trespass, and is fenced to exclude cattle. A well-constructed fire line surrounds about half of the property.

Bryson City, N. C., owns 196 acres mostly forested. It has a watchman to prevent fire and trespass, but the forest has not been organized for forest production.

Marion, N. C., owns 628 acres. It is patrolled to prevent fire and trespass and a fire line entirely surrounds it. It has recently been fenced to exclude cattle.

Newington, N. H., owns a tract of 200 acres, most of which carries a dense pine stand which varies in age from 20 to 60 years. A few years ago it became necessary to make some town improvements. On a patch of six acres in the town forest an older growth of pine was sold for $2,000, which made the necessary improvements without increasing taxes. Plans are now under way to plant the cut-over land and to survey and map the growth, dividing it into age classes and forming a systematic plan of cutting and reforestation. Eight thousand pine trees were planted in 1914.

The city of Manchester, N. H., owns 1,800 acres, which protects its water supply. Rapid progress is being made in the removal of oaks and gray birch that are subject to damage by the gypsy moth and in planting the open land with pine. During the years 1914-15, 15,000 pines were set out.

The city of Concord, N. H., owns about 400 acres for water protection. In 1914, 50 acres of land, badly infested with gypsy moth were lumbered, bringing to the city a revenue of over $4,000. The brush on this lumbered area was burned and reforestation established. So far 87,000 pines have been planted.

The above have been selected from a large number of brief descriptions because they fairly well represent the point of view that different communities hold in regard to their forest property and the increasing recognition of the value of these lands for the production of timber without in any way lessening their importance for protection purposes and for purposes of recreation.

The Conservation Congress and National Forest Conservation

A reply by Ex-President Henry Sturgis Drinker to President Pack's article on this subject in the June number of AMERICAN FORESTRY.

TO the Editor of AMERICAN FORESTRY:

I recently received from our esteemed President, Mr. Charles Lathrop Pack, a letter under date of June 12, in which he said: "You have seen my article in regard to the national forests from the national point of view, in the June number of AMERICAN FORESTRY. I think it would be a good idea if you felt that you could publish something in the next number; and I am sure that Mr. Ridsdale would be glad to afford you an opportunity."

I had not seen Mr. Pack's article at the time I received his above letter. The June number of AMERICAN FORESTRY was not then out. I wish I had seen the article before its publication so that I might have placed at Mr. Pack's service the information on the same matter, that, pursuant to his request, I now place at the disposal of AMERICAN FORESTRY. After seeing Mr. Pack's article I wrote him that I would act on his suggestion, and in replying he wrote me (June 22), "I hope you will write an article for AMERICAN FORESTRY as you have indicated. It ought to be of help to the good cause," and this article is published only after its submission to Mr. Pack, and as the result of my conference with him.

Mr. Pack's article in June FORESTRY was apparently based on a feeling that the resolution on public lands quoted by him from the resolutions adopted by the recent conference of the Conservation Congress held in Washington May 2 to 4, was, as Mr. Pack expressed it, "diametrically opposed to the policy of National Forests, and in favor of their dissolution." This is a misconception. The resolution does not refer in words, nor was it intended by the Committee on Resolutions to refer by implication, in any way, to the National Forests.

It is in fact merely a repetition of the resolution in the same words recommended by the Resolutions Committee of the Conservation Congress held at Washington in November, 1913, of which committee Capt. J. B. White, ex-president of the Congress, was chairman, and was adopted with the other resolutions of that Congress at its final session held November 20, 1913, and published with the other resolutions of that Congress, after its adjournment. That it was the same resolution is shown by the following from the records:

Resolution on Lands as adopted by the Fifth National Conservation Congress in November, 1913.

"That the established, traditional, and sound policy of the United States with respect to the disposition of its unappropriated public lands is opposed to the making of a direct revenue thereby beyond the expense incident to the surveying, classification and disposing of such lands, but on the contrary that said policy is intended to encourage and promote the settlement and development thereof, and that any act of Congress, or any administrative construction thereof, which is not in harmony with this policy, does an injustice to the new States by placing them on an unequal footing with the original States and by discouraging and preventing the settlement of such new States and the development of their resources."

Resolution on Lands as adopted by the recent Conference of the National Conservation Congress on May 4, 1916.

"The established, traditional, and sound policy of the United States with respect to the disposition of its unappropriated public lands is opposed to the making of a direct revenue thereby beyond the expense incident to the surveying, classification and disposing of such lands; on the contrary, said policy is intended to encourage and promote the settlement and development thereof, and any act of Congress, or any administrative construction thereof, which is not in harmony with this policy, does an injustice to the new States by placing them on an unequal footing with the original States and by discouraging and preventing the settlement of such new States and the development of their resources."

It will be seen that the resolutions are identical. A careful reading of this resolution shows that it contains no reference to the National Forests, which have been duly "appropriated" and set aside by the Government as such. The resolution relates wholly and in specific terms only to "unappropriated" public lands of the United States, and was intended, as it says, solely to endorse a policy to encourage the settlement and development of such unappropriated or unseated lands.

The resolutions on our "Public Lands" adopted by the Conservation Conference at Washington in May last were offered by Samuel Herrick, Esq., a delegate to the Conference or Congress of May, 1916, from South Dakota. Mr. Herrick was also a delegate from South Dakota to the Congress of November, 1913.

He was a member of the Committee on Resolutions of both Congresses, and at that of 1913, he was appointed by Capt. J. B. White, chairman of the Committee on Resolutions, a member of the Subcommittee on Lands, of which subcommittee the late Henry C. Wallace, past president of the Conservation Congress, was chairman. Mr. Herrick prepared the resolution in question, and he states that it was adopted in 1913 by the subcommittee, and subsequently by the full Committee on Resolutions, of which a large number were foresters, without dissent, and the record shows that it was adopted by the Congress on its presentation with the other resolutions at the final session of the Congress of 1913. Mr. Herrick offered this resolution anew in the Committee on Resolutions of the Conference of the Conservation Congress held in May last, deeming it well to have it reaffirmed, just as the resolution recommending the taxation of growing

timber at the yield time, adopted in the resolutions of the Conservation Congresses of 1912 and 1913 was reaffirmed in the resolutions of this year. This resolution on lands was unanimously adopted by the Committee on Resolutions, and as chairman of that committee I can certify that no one in the committee had any idea that it could be in any sense taken as referring in the remotest degree to the National Forests or to the past or present policy in regard to them.

May I add that my own record of work for forestry in the past three years, during which I have been honored with the presidency of the American Forestry Association, and my interest in and work in promotion of the National Conservation Congress, of which I am vice-president and a member of the executive committee, warrant me, as chairman of the Committee on Resolutions of the conference of the Congress recently held, in contributing this clearing up of any misconception of this resolution.

If there is anything objectionable in the resolution, it is interesting to bear in mind that it was formulated in 1913 in a subcommittee of which Mr. Henry C. Wallace, ex-president of the Congress, was chairman—was presented to that Congress by the Committee on Resolutions, of which Capt. J. B. White, ex-president of the Congress, was chairman, and was adopted at that Congress at its final meeting and has stood as an expression of opinion by the Congress on a proper policy on the untaken lands of the nation, for three years.

I have had the privilege and the pleasure of attending the successive meetings of the Conservation Congress at Kansas City in 1911, Indianapolis in 1912, Washington in 1913, and Washington in 1916. At no Congress have I seen forestry interests more sympathetically considered and supported. The admirable report of the Committee on Forests at the recent conference was received with appreciation and approval, as were the other valuable reports on various subjects. Approval was given to them all. It was the distinct understanding of the members of the Resolutions Committee that these reports having been presented to the Congress and received with approval, together with the resolutions recommended in them, by the Congress, did not call for further action by the Resolutions Committee, and that committee therefore addressed its work wholly to formulating and presenting in final form the resolutions submitted to it which had not been the subject of committee reports, and which had not been already acted on by the Congress.

HENRY STURGIS DRINKER.

PRESIDENT PACK'S STATEMENT

MY article in the June number of AMERICAN FORESTRY was written to express our belief in the National Forest Conservation policy, particularly as to the National Forests. The fact that similar resolutions, as explained by Dr. Drinker, were passed at more than one meeting, does not change these principles. Two wrongs do not make a right. That it was well to plainly express our faith in the National Conservation policy at this time is shown by the large number of letters and messages of approval which I have received.

I feel assured I voice the feeling of the great body of our citizens interested in the faithful conservation and use of our National Forests in expressing the regret that we have not been assured that the Resolutions Committee of the Washington conference believed in the national policy of administering these great assets held in trust for the people.

CHARLES LATHROP PACK,
President American Forestry Association.

FOREST FIRE PROTECTION

WISCONSIN has had no destructive forest fires since 1911; but when we seem most secure is time to take the most effective defensive measures. Four years of immunity should be a warning of danger. Every man in the service of the Wisconsin Conservation Commission is called on now to prepare for a warfare against forest fires the coming season. From April until the fall of snow in November or December, the strictest watch must be maintained; every smouldering spark must be extinguished, and every man going into the woods must find a fire warning staring him in the face from trees on trails and around lakes frequented by campers and fishermen and hunters."

This was the substance of a warning service by Commissioner F. B. Moody, of the Wisconsin forestry force at a conference of all men of the department, held at forestry headquarters at Trout Lake. Prevention of forest fires and all subjects in connection with forestry and forest fire conditions were discussed in a series of nineteen papers, which were followed by expressions of the views of the experienced men of the service.

F. G. Wilson, who is located on the Devils Lake reserve, said that the entire campaign for forest protection was threshed out at the two days' conference. Results of forest fires, cause of forest fires, railroad fire tower's value to the fire elimination problem, and a general plan of fire protection for the State, were the questions that came up, in addition to the general topic of State forestry and handing State reserve lands.

"The forestry department will send out thousands of cards giving advice to summer resort people, campers, fishermen and hunters, in regard to fire protection." said Mr. Wilson. "The old plan of quoting the law will be abandoned, and instead the department in terse terms will ask cooperation in preventing fires—in extinguishing matches before throwing them away,—and especially in putting out fires before leaving a camp. The great slogan will be, 'One tree will make a million matches, and one match will destroy a million trees.' "

BOOKS FREE TO MEMBERS

Members of the American Forestry Association are offered books on trees, birds and flowers, without charge, for securing new members. See offer beneath Table of Contents.

The Lumber Supply of the World

"IN figuring future lumber prices, it must be remembered that all quotations up to this date are directly dependent on additions to the producing districts of new primeval forests, from which the demands were filled by lumber until then valueless and therefore cheap in the first stages of export," says an article on "The Conditions and the Future of Swedish Forests," by Prof. Gunnar Anderson, in the popular magazine, *Skogen* (The Forest), from which is here reprinted the following interesting statement about the world's lumber supply: "As long as the steadily increasing demands for lumber can be filled by continuously opening up new primeval forest land, it cannot be expected that lumber prices will reach the height required by normal producing conditions, that is, to yield a proper profit relative to the value of the land, and the costs of production. The great question for the Swedish forestry industry, therefore, is: Are the primeval forests, accessible in the world, soon to be used up, or when will they be?

"In the central parts of the European continent, the primeval forests have gone long ago and the wood has changed into a community of culture plants, completely governed by man's hands, and requiring considerable labor and capital from man. They are the prototypes for the forests of the future all the world over. In the Carpathian and Balkan countries, however, there are still quite considerable districts of untouched forests. Yet they are limited in size, and in order to exploit them such costly railroads would be required that these forests cannot greatly influence the lumber prices.

"In Europe, our greatest competitor, and the only dangerous one, is the great North Russian pine district. At present it contains enormous, untouched quantities of timber. However, for the greater part these are not accessible at a cheap price. The levelness of the country, the comparatively slight rainfall, the rivers' chief direction toward the Arctic, their low-water state during the large part of the year, the violent high water, which sweeps down during the snow melting season from South to North, the sparse population of the country, the difficulties of navigating the Arctic, etc., all work together to making the shipping of lumber from these Russian woods to exporting points and consuming centers hard and costly. In addition thereto, private owners must ask a stump price for their wood, be it ever so low, equal to that which the Russian government does on its own vast domain.

"It is not quite impossible that the state would be willing to give away outright the fully grown wood to promote timber felling and effect settlements within certain districts. At the present prices only a strip of certain width along the waterways could be exploited with economical profit. Corresponding to every $.1353 per 1,000 board feet at which lumber prices are rising in the world market, a wider strip can be taken. For us, however, this will mean an equivalent rise in our lumber prices.

"The greatest supply of pine wood lumber which in our time can be found on the earth, probably is in the Siberian pine forest district—the so-called *taigan* from Ural in the West to the Pacific Ocean in the East. Is it possible to bring this to the market at prices ruinous to us? I certainly believe that the answer to this is 'No.' With the very great awakening which Siberia will experience in the next half century, strenuous efforts will certainly be made to make this possible. Its existence will be of the greatest importance to the development of the country itself and indirectly it will relieve the world market from its scarcity of lumber, of which Siberia's agricultural districts would have otherwise absorbed a good quantity. Some possibilities may also exist for exportation to other countries in need of lumber. Corea and East Siberia will surely furnish considerable quantities to China and Japan where continuous development after the European model creates a still greater demand for lumber. From the West Siberian *taigan* it is likely that attempts will be made to ship lumber by rail, and above all by sea, from Ob and Yenisei, also over the Arctic, to the central countries of the world market. I am convinced that by means of modern technology, within some decades it will be possible to do somewhat safe shipping from these rivers to Europe, but I am also absolutely sure that the freight rates will be so high that lumber can stand them only when lumber prices have risen so much that forestry in Sweden has become a very lucrative business. For the reasons stated it can hardly be conceived that from the enormous reserves of the Russian and Siberian forests any great quantities can be thrown on the world market at any price which would be ruinous to the industry.

"Out of the great pine wood districts of the ancient world there remains but the Indian district on the slopes of the Himalaya and in its valleys. There, the English for decades have expended extensive and successful labor to bring about good forestry conditions. India is the only country under English rule—not even excepting the mother country—in which rational forestry is practised to any considerable extent.

The enormous quantities of lumber which a big, richly populated country, developing at a lively rate, like India, demands, will hardly be filled from its own forest supplies. Conscientious cultivating of these may, of course, decrease the demand for foreign lumber and thus to some degree aid in keeping down the world market prices, but in the long run it will not be able to hold them on the same level at which they generally have stayed during this decade.

"If we then pass over to the new world, we find on the



North American continent two big forest districts. The great eastern is parted from the western, the Pacific territory, by the vast prairie districts, where nowadays such a large part of the world supply of wheat, corn, etc., is produced. The northern part of the eastern forest district resembles mostly Scandinavia and North Russia, the middle and the south parts the former forest districts of the European continent. Within the more easily accessible districts, man has dealt with axe and fire, and within the less accessible he has ruled with fire, in such a manner that nobody who has not seen it with his own eyes could possibly imagine its like. The result is at any rate, that the wood in those regions from which it might be shipped at prices halfway reasonable, is just as severely taxed as in North Sweden. In addition thereto, a population, with a strong demand for lumber, now counting over 100 million, is living in North America. They will soon be confronted with a real lumber scarcity, which already should have made itself painfully felt, if the big pine woods in the Southern States—resembling the pine woods within the Mediterranean territory, already wasted by Phenicians, Greeks and Romans, etc.—had not provided a short respite. In America, during the last half century there has been a squandering, a wastefulness, surpassing every description. Nothing in the least has been done from a practical point of view up to this century to stop it and to restore the forests. It will also be the scarcity of and demand for lumber which, within some decades, will more than anything else drive lumber prices high.

"But North America has also west of the prairies considerable forest districts. In the Rocky Mountains there are forest lands with sparsely set woods and excellent lumber. These are of great importance to the development of neighboring states, which, for the most part, are poor in woods, but will have but little and indirect influence on the world market of lumber.

"On the other hand, it is quite a different matter with the thick, tall grown, splendid woods which cover the slopes of the Coast Cordilleras toward the Pacific from California in the south to Alaska in the north. There grows the only wood supply of the world which is of real danger to us.

"Not yet have they begun to be exploited on a real large scale, but at any rate the lumber therefrom is our worst competitor in the countries bordering on the Pacific Ocean. Once the Panama Canal is definitely finished it will not take long until "Oregon pine" and other Pacific Coast woods will appear on the European market. Scores of new sawmills and wood pulp mills will be built during the coming decades on the shores of British Columbia, and from there enormous quantities of lumber and paper pulp will flood the world. The wages certainly are high, and the waste is exorbitant, but that can be overcome, and for every dollar saved these well-located, quickly growing woods become more and more capable of competition. Nowhere on the face of the globe are so many millions to be gained by clever, financially strong people.

"Only when the primeval forest supply in the woods on the North American Pacific Coast is exhausted will the lumber prices rise considerably. When will that happen? That depends on several factors. The world war surely is driving back the economical development for at least one decade; therefore, it may take three or perhaps four decades until those reserves are emptied. It is possible that it will come quicker, depending on how the lumber demand of America itself is growing.

"I have now reviewed the great reserve supplies of existing pine wood. The tropical zones have none such and their woods, for many reasons, never can replace those of the temperate climes. The supply of pine wood in the temperate forests of the southern hemisphere is so insignificant that neither at present nor in the near future could there be any thought of supplying even Australia, South Africa and South America, with their demands for lumber, much less to compete on the markets of the northern hemisphere.

"This inventory proves that really there are very few countries which by nature, position and shipping possibilities, etc., have a chance to produce and to export to the world market any wood products at prices so advantageous to the country as Sweden. When in addition our investigation shows that the demand of the world is steadily increasing, whereas the supply of the world during the next decades surely is going to decrease, it is evident that we confidently can expect to get still better and better payment for the products from our woods. The main thing is to produce as much as possible, so we will have something to sell when the prosperous times are coming. We have still twenty or thirty years in which to prepare. It is important that we use this time well, that with our limited money supply we make every effort to painstakingly and with foresight invest as much as we can in the improvements of our woods. That this will prove highly remunerative to the generation coming after us, there can be no doubt."

A CONSERVATION EXHIBIT

A unique exhibit in conservation was held during the latter part of May at the Seventh Regiment Armory in New York City under the auspices of the General Federation of Women's Clubs and the personal direction of Miss Mira L. Dock, chairman of the Forestry Committee, and Mrs. John Dickinson Sherman, chairman of the Conservation Department.

The exhibit was of the most practical nature ever held and was no less marked in its aesthetic and poetic features. Shade tree commissions, the United States Forest Service, the United States Bureau of Entomology, the New York State College of Forestry, the National Association of Audubon Societies and Burroughs Clubs all did their best to bring home the fundamental principles that each stood for, and the coordinated efforts of all were an entire success. AMERICAN FORESTRY did its share in obtaining the necessary cooperation and coordinating the various branches.

Wood Preserving Department

By E. A. Sterling,
Ex-President American Wood Preservers' Association.

IT SEEMS a far cry from automobiles to creosote wood, but really there is a close connection. The automobile revived and developed the movement for better roads, and motorists will continue to support better highway construction and maintenance. With the building of modern roads, including county, State and national, arose the problem of economical, safe and permanent highway bridges. It is here that the auto and wood preservation are on common ground.

The steel bridge on country roads has been common for years. Of late the concrete bridge has appeared as a link over streams and depressions. The steel bridge is not giving the service anticipated because in so many cases allowed to rust and deteriorate from lack of painting. The concrete bridge or trestle is expensive and unless well constructed suffers from expansion and contraction where temperature fluctuations are extreme. To meet the demands of economy and permanence, with a minimum of expense for upkeep, the creosoted timber highway bridge is now receiving consideration.

A more logical bridge or culvert material is not known. Creosoted timber will not decay, has the necessary strength, can be worked and handled easily, is not affected by heat or freezing, does not buckle, dent or puncture, does not need painting, and in every way is the ideal material for highway bridges. Recognition is now being given to these advantages, and helpful information which will effect a big saving to taxpayers is being put into the hands of highway engineers and road commissions. The Southern Pine Association has issued an attractive and instructive illustrated booklet on "Culverts and Bridges of Service," and the National Lumber Manufacturers' Association has in preparation a general treatise on the same subject by a well known State highway engineer.

Nor is the use of creosoted wood on highways confined to bridges. It serves for the sluices and ditch protection, holding embankments, and for the posts and fence material along improved roads. All of this development is a conservation measure, because it gives long life to the timber used, utilizes local material in many cases and gives a value to timber which it might not otherwise have.

THE crisis in the creosote market caused by the shutting off of imports has been mitigated to a considerable extent. While the European war still prevents creosote coming from Germany, Great Britain has been supplying considerable quantites of creosote oil. Another influence is the increased domestic output of coal tar and while all is not yet distilled so as to produce the by-product creosote, the home supply has increased not only temporarily, but probably permanently. An unexpected development of recent months was the receipt of cargoes of Japanese creosote on the Pacific Coast. It was only a few years ago that several Japanese delegations studied the creosote industry in America, but they have already applied the knowledge gained by producing creosote for our markets.

PROGRESS that is slow is often none the less sure. For many years creosoted fence posts have been advocated because economical in themselves and a means of utilizing quickly decaying local timber, which otherwise would often be wasted. This is practical conservation. State agricultural colleges and the United States Forest Service have consistently advocated creosoted fence posts and large numbers are in use. Large consumers, such as railroads, have also used creosoted posts, but only recently have they been put on the market in a wholesale way. A big lumber company is now advertising posts which are thoroughly creosoted and can be depended upon for almost unlimited years of service. This not only means an economical, permanent and easily handled post for the consumer, but is another step in utilizing all parts of the trees which are felled for lumber. The waste through lack of markets for by-products is thus gradually being reduced, and actual conservation of our forests brought a step nearer.

THE small consumers of lumber are not expected to know the details of its best use. Part of the new conception of lumber merchandising is to give the user more facts and information on which to select and properly use the wood he needs for home building purposes. Not a small part of this is concerned with proper preservative treatment. As an aid to this end a new educational bulletin has just been issued by the National Lumber Manufacturers' Association of Chicago on "The Preservative Treatment of Farm Timbers." It is one of a series of farm bulletins, treating in a broad educational way the proper design and use of farm structures.

A MUNICIPAL creosote wood block plant for Detroit, Michigan, has been recommended by the Mayor in his annual message to the Common Council.

THE Louisville & Nashville Railroad Company is reconstructing its timber-treating plant at Gautier, Mississippi. There will be three retorts, one 68 feet by 115 feet, one 6 feet by 133 feet 1 inch, and one 7 feet by 133 feet 1 inch.

Editorial

LOUISIANA FORESTRY AND THE CONSERVATION COMMISSION

AN important hearing was held on June 14 before the committee on Natural Resources of the Louisiana Legislature on the Hughes forestry bill, which proposed to establish a department of forestry independent of the State Conservation Commission and patterned after the forestry law of Texas, under which a technical state forester is appointed by the regents of the state university. The bill was opposed by the Conservation Commission and reported unfavorably, but the hearing served to focus the attention of the State on the fact that up to this time no forestry has been attempted by the Conservation Commission, nothwithstanding their responsibility and authority given them under existing laws to undertake this work.

The claim was made by the Commission, and with some justice, that no funds have been available for forestry, since the revenue from the state products tax on timber and minerals went into the treasury and was not a part of their income. The Commission's revenue available for expenditures in the fiscal year 1914-15 was $87,275.02, and in 1915-16, $87,706.18. Its expenditures were respectively $121,324.30 and $97,174.67. When the idea of consolidating the forestry work of this State with fish and game, minerals, and other resources was adopted, the Commission was given discretionary power in the proportioning of its income to meet expenditures. Fish and game, marine fisheries and other work were already established. Forestry was new and unfamiliar. The inevitable result of this system was the absorption of the entire fund by the more urgent and better organized work and the total neglect of forestry. The technical forester needed to start the work was not appointed, for lack of funds to pay him, and lacking all real incentive for true constructive forestry the Commission did not even urge the specific appropriation of funds for this purpose—an alternative at all times available to them. Meanwhile the State was receiving, outside of the revenue of the commission, the income from the products tax on timber and minerals, which brought in $113,992.50 for 1913, $115,496.14 for 1914, and $92,554.67 for 1915. This tax, paid largely by lumbermen, the State now proposed to double purely as a revenue measure. It was brought out at the hearing that when this products tax was imposed the understandings and intention of its advocates was that the State would expend upon forestry a sum at least the partial equivalent of the tax. This the State had failed to do.

While the committee did not accept the proposed separation of the forestry department from fish and game protection and decided in favor of retaining the consolidation, they did admit the justice of the demand for specific appropriation of funds for forestry, and an amendment was drafted to the timber tax bill, providing that 25 per cent of the revenue from timber alone shall be devoted to forestry. If this measure passes, the Conservation Commission will be enabled to organize a forestry department and will have approximately $20,000 per year for this purpose.

Effective work in state forestry at present can be conducted on an even smaller appropriation, provided the work is centered in an able, well trained forester whose position is not subject to the changes and uncertainties which are ordinarily the lot of the appointees of a commission organized as a part of the regular machinery for state government. The word "politics" as applied to this situation does not signify either corruption or deliberate neglect and inefficiency. It may be confined in its meaning to the recognized practice of considering offices of an appointive character as due by right to the party in power and to be filled by their adherents. The pressure of such obligations upon the heads of departments is enormous. The plea is that just as good "Republicans," "Democrats" or "Progressives," as the case may be, can be found, therefore the old incumbent must step out.

This principle will not work in state forestry. State forestry organization must be continuously in the hands and under the direction of a man capable of following up the policies inaugurated through many years to a successful conclusion. If his job depends, not on his efficiency, but on the accident of political elections, the state will not secure men of the highest ability nor get real forestry work done.

It remains to be seen whether the proposed organization of the forestry department and its continuance under the Conservation Commission will accomplish this result. In the interest of forestry in Louisiana we sincerely hope that the passage of the proposed measure may be followed by the selection of a state forester of real ability and his retention indefinitely. Initial errors, both in organization and personnel, take years to overcome. The right start means everything to the work of a state.

Canadian Department

By Ellwood Wilson

Secretary, Canadian Society of Forest Engineers

There is at present a great shortage of dowels, skewers and small manufactures of hardwood in England and prices have advanced materially. An order for one million hardwood backs for brushes has just been placed in Ontario.

The Department of Forests and Mines of Ontario has just issued a warning that the White pine blister rust has been found on the stock of 1908 and asking all those who planted pine in that year to look over their plantations and see if the disease has appeared.

The Local Chapter of the Daughters of the Empire in Ottawa have started an active campaign to save waste paper. This is a good step, as in this time of awful waste of everything by the nations at war, those at home must save in every way possible.

The price of pulpwood in Canada has increased ten cents a cord for 1916 over 1915, all Provinces except Quebec sharing in this increase. The total consumption has increased as follows: Quebec, 9.7 per cent; Ontario, 7.3 per cent; New Brunswick, 134.8 per cent; British Columbia, 13.2 per cent, and Nova Scotia, 93.7 per cent.

There is a very interesting article in Espana Forestal for March on the "Psychology of the Tree." This is a side of forestry seldom treated.

The First Battalion of Lumbermen, the 224th Forestry Battalion, Canadian Expeditionary Force, has done such good work in England that two more battalions have been asked for by the English authorities. One will be commanded by Lt. Col. J. B. White, Director of the Canadian Forestry Association and Late of the Riordan Paper Company, and the other will be recruited in Ontario by Lt. Col. W. R. Smyth, M. P. P., of Algoma.

Mr. R. M. Bagg, of New York, late with the Laurentide Company, Ltd., enlisted in the First Forestry Battalion.

Mr. K. C. Baker, of Greenwood, N. Y., who is a graduate of the University of Michigan, and worked for some time with the Laurentide Company, Ltd., and then went out to Singapore for the United States Rubber Company, has just been home on a visit, and has married Miss Kellogg, who will return with him to the Far East. Mr. Baker has been in charge of rubber plantations and also has been sent to India and China on some trade missions.

Two young reindeer have been born in the herd of the Laurentide Company, Ltd., which are believed to be the first ones born on the continent in Canada. They are now about three weeks old, much lighter in color than the adults and are growing finely. The herd now consists of three males, four females and two fawns.

Mr. R. R. Bradley, Forester of the New Brunswick Railway Company, was married recently.

The Belgo-Canadian Pulp and Paper Company, Ltd., of Shawinigan Falls, Quebec, is considering planting and has already done something on a small scale. Mr. L. Devenyns, their Superintendent of Woodlands, who is a Belgian, went over as soon as war broke out and did splendid service in the gallant Belgian Army until wounded so seriously that he was invalided and has now returned to his work in Canada.

Pte. E. G. McDougall, of the Canadian Society of Forest Engineers and of the British Columbia Forest Service, has been wounded.

Mr. W. L. Scandrett, of the Canadian Society of Forest Engineers, and Messrs. Bentley and Hughes are all in England in the army, the former being in the aviation corps.

The excessive rain in Quebec this season has been a great help in the prevention of fires and in planting operations. The St. Maurice Forest Protective Association reports on one or two small fires and that the settlers and farmers are cooperating with the fire-rangers in a way which a few years ago would have been thought impossible. Arrangements have been made with the National Transcontinental Railway in regard to patrolling their right of way, by which the railroad will pay one-third of the cost of the labor and will pay for gasoline and oil consumed by the power speeders. Thanks are due Mr. Brady, of the Transcontinental, for taking this position. All the St. Maurice rangers have this year been uniformed with green shirts with "Protection Foret" in red letters across the chest. The Parish Priests have done a great deal to help the Association.

Mr. G. C. Piché, Chief Forester of Quebec, has changed the date of his forestry meeting from this month to the month of August. He has much interesting work to show and it is hoped that many American foresters will attend the meeting and also avail themselves of the opportunity to see the work of the Laurentide Company, Ltd., and the ancient city of Quebec.

Mr. P. Z. Caverhill, Forester of New Brunswick, has his work now organized and is covering about 60,000 acres per month. His staff consists of Messrs. G. H. Prince, H. C. Belyea, Pellerose, J. W. Burn, Jagoe, Kilburn, Lee, F. S. Young and Percy Crandall.

Mr. R. H. Campbell, Director of the Dominion Forest Branch, has been elected a member of the Society of American Foresters.

The Annual Special Number of the *Canada Lumberman and Woodworker* is just out and is the best ever issued.

The Wayagamac Pulp and Paper Company, which left the Cooperative Association on the plea that it cost too much to have their limits ranged by the Association, is finding it much more expensive to do the work itself.

In the *Canadian Forestry Journal* for May there is a very interesting article by Mr. J. C. Blumer on "A Winter Survey in North Saskatchewan," in which Mr. Blumer tells of his trip in that country and describes conditions both as regards the Indians and the timber. He notes a temperature of 53 degrees below zero on one occasion.

Mr. Clyde Leavitt, Forester to the Dominion Conservation Commission, has a splendid article on "Forest Conservation as a War Measure," in which he says that "Natural resources lie at the foundation of all preparedness whether for peace or for war," and gives a ringing call to action for the elimination of politics and the introduction of common-sense efficiency in the handling of our Government-owned natural resources.

The work on the big storage dam under construction by the Quebec Government on the upper waters of the St. Maurice River is progressing favorably and will be a great help in controlling water conditions on which the industry of the whole valley depends.

A postal card has been received from Australia from Mr. MacMillan, Forester and Trade Commissioner of the British Columbia Government from Australia. Mr. MacMillan's trip around the world is already bearing fruit for his Government, and shows a wise and far-sighted policy on its part.

Fire Conditions in the Northwest

The statutory forest fire season, during which permits for slash burning and other precautions are required, is now on in the Pacific northwest, with conditions offering little immediate danger, according to bulletins received by the Western Forestry and Conservation Association. The wet weather has, however, prevented the usual spring cleaning up of loggers' and settlers' slashings, thus leaving a greater menace when dangerous weather arrives. Except in rare cases, with unusual care and under permit and supervision, it will not be safe to burn now before fall and the winter's accumulation will create serious hazard all summer. For this reason preparations are being made for strict enforcement of all fire laws, especially those dealing with clearing and with spark-emitting engines.

Warning the public of approaching weather conducive to forest fires will this year be recognized by the United States Weather Bureau as a necessary service comparable to storm and frost warnings. In addition to the telegraphic forecasts of hot and windy weather usually furnished the private and public patrol forces, predictions will also be mailed to post offices in forest regions, for conspicuous posting where they may be seen by people likely to use fire in clearing and by campers and travelers. A special card has been devised, bearing fire precautions on the margin.

Coolidge in Business

Forester Philip T. Coolidge on July 1st opened an office at Bangor, Maine, for the practice of forestry and will devote himself to the development of the business. He will specialize in management and protection of woodlands, improvement cuttings, planting, timber estimates, maps and surveying.

Mr. Coolidge graduated from Harvard in 1905 and from the Yale Forest School in 1906. He was employed as a Technical Forester by the Forest Service in the West from 1906 to 1909, the U. S. Forest Service again in 1914 for examination of conditions in Maine and Pennsylvania, as to the possibilities of government land purchase under the Weeks Law through which the government is buying land for forest reserves in the White Mountains in New Hampshire and in the Southern Appalachians. He was Professor of Forestry at Colorado College from 1909 to 1912 and during the years 1912 and 1913 he was director of the Ranger School of the New York State College of Forestry.

The Zimmerman Pine Moth

By the simple method of using the "spike-topped," lightning-struck, and gnarly branched mature trees for firewood or other domestic purposes, the entomologists of the United States Department of Agriculture believe that the damage done by the Zimmerman pine moth, especially to yellow pine in the West and white, red and various other pines in the East, can be greatly minimized.

As a general rule, trees that below the spike show branches with yellow needles are almost certain to be infested. Such trees, as well as lightning-struck trees which remain green, and those showing knobby growths on branches are likely to harbor great numbers of insects—to be the brood trees—and should be cut out and burned or used for firewood before spring; otherwise the moths resulting from the caterpillars in these brood trees will attack the second growth, and when a tree is badly attacked the pest may kill big portions of it besides making the lumber pitchy and unsuitable for anything where shrinkage is objectionable.

If the brood trees are cut out, woodpeckers, especially the hairy woodpecker, will probably attend to the lighter infestation in the young trees, as this bird has been observed to feed heavily on this caterpillar. This remedy is particularly strongly recommended for wood lots, as a number of experiments have shown that by using the right trees for firewood the damage is either greatly minimized or absolutely controlled.

Our Tree Pictures

The fine White oak tree which was the cover picture of the January issue of AMERICAN FORESTRY, stands on the Guyer farm at Warriors Mark, Huntington County, Pa., and the elm, which was the cover picture in the May issue, is owned by Mrs. Montgomery, of Shippensburg, Pa.

Photographs of some of the elm trees in the May issue were by Nathan R. Graves, 84 Exchange St., Rochester, N. Y.

Mt. Alto Forest Students

Of the twenty-one men who took the examinations last week for entrance to the State Forest Academy at Mont Alto, Pa., fifteen have been accepted. Five have been assigned to the Clearfield State Forest, five to the Greenwood Forest in Huntingdon County, and five to the Buchanan Forest in Franklin County. They will spend six weeks in practical woods work, at the end of which an additional examination will be given, and the ten men with the highest standing will be admitted to the Academy.

Book Reviews

"My Home in the Field of Honour." By Frances Wilson Huard. 12mo. Geo. H. Doran Co., N. Y. Net. $1.35.

This is a graphic account of civilian flight before battle in this war. A woman's retreat from her beautiful home northwest of Paris, and the simple but dramatic narrative of her experiences. Frances Wilson Huard (La Baronne Huard) is the wife of Charles Huard, official painter of the Sixth Army of France, and the daughter of Francis Wilson. She has now a hospital at her chateau of Villiers, and has been giving talks in America in its behalf.

"American Boys' Book of Bugs, Butterflies and Beetles." By Dan Beard. Lippincott's, Philadelphia. Price, $2.

Dan Beard—a name to conjure with, for boys—has invented a new method of studying natural history. The myriad activities of the great Chief Scout and Pioneer of America in behalf of American boys, lead naturally to this service. He opens a door that will tempt every live boy —and his sister, as well—into the fascinating world of natural history. Dan Beard cannot see any reason for taking the pleasures of life with long faces. If any youngster doubts that a study of this book is entitled to rank as a pleasure, it is because he is not acquainted with the author's method. It was a pleasure to Mr. Beard himself from the first hour that he can remember, and he has never lost his enthusiasm, nor the power to impart it to others.

"The Alligator and Its Allies." By A. M. Reese. Putnam's, New York.

Using the alligator as the type for the study of the Reptilia, the book first discusses the classification, habits, distribution, etc., of the Crocodilia, with especial emphasis upon the American Alligator. Some space is given to the economic aspects of the group. There follow chapters dealing with the anatomy of the skeletal, muscular, digestive, respiratory, vascular, nervous, and urogenital systems. The concluding chapter is a description of the development of the American Alligator. An extensive bibliography of works dealing with the Crocodilia follows the descriptive matter and is followed, in turn, by an exhaustive index. The book is illustrated with 65 figures and 29 plates, many of which are new, while others are taken from well-known sources.

"The Industrial and Commercial Schools of the United States and Germany. A Comparative Study. By Frederick W. Roman, Ph.D. Putnam's, New York.

This book is offered as a basis for industrial and commercial training, a comparison of the character, quantity and quality of the instruction offered in the elementary school systems of the United States and Germany. The grades reached by the pupils before leaving the elementary schools are contrasted; also the pupils' attitude toward work, play, and life in general. The book gives an excellent insight into the industrial and commercial strength of the two nations.

Three Sons and a Mother. By Gilbert Cannon, $1.50. George H. Doran Co., New York.

This is the story of a Scotch family —of Margaret Keith Lawrie, who brought up her three sturdy boys and two lassies on a paltry 90 pounds a year. Of the Lawrie boys' careers in the bustling English town of Thrisby, where their Uncle Andrew offered them a "start" in his cotton mill—and then died.

Good Old Anna. By Mrs. Belloc Lowndes, $1.35. George H. Doran Co., New York.

Simple, faithful, loyal to her mistress, the Minor Canon's widow in the little English cathedral town! How cruel it was that the Great War had to come, that this placid, industrious old servant had to be made the tool of the astonishing German organization. This is a subtle, convincing picture of one of the grim phases of the war.

With the Zionists in Gallipoli. By Col. J. H. Patterson, D. S. O., $2. George H. Doran Co., New York.

The Zion Mule Corps—500 officers and men—was the first Jewish military unit formed in 2,000 years. It consisted of Russian-born refugees in Palestine, who, rather than serve the Turks, preferred to return to Egypt, the old land of bondage and later to serve under the English government against the Turks and Germans.

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MONTHLY LIST FOR JUNE, 1916.

(Books and periodicals indexed in the library of the United States Forest Service.)

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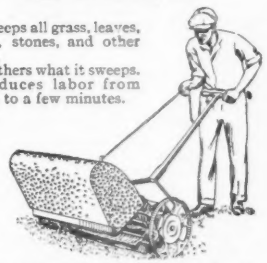
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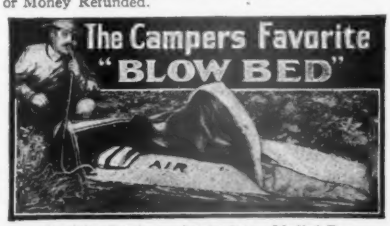


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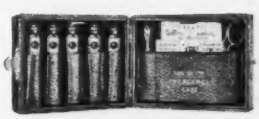
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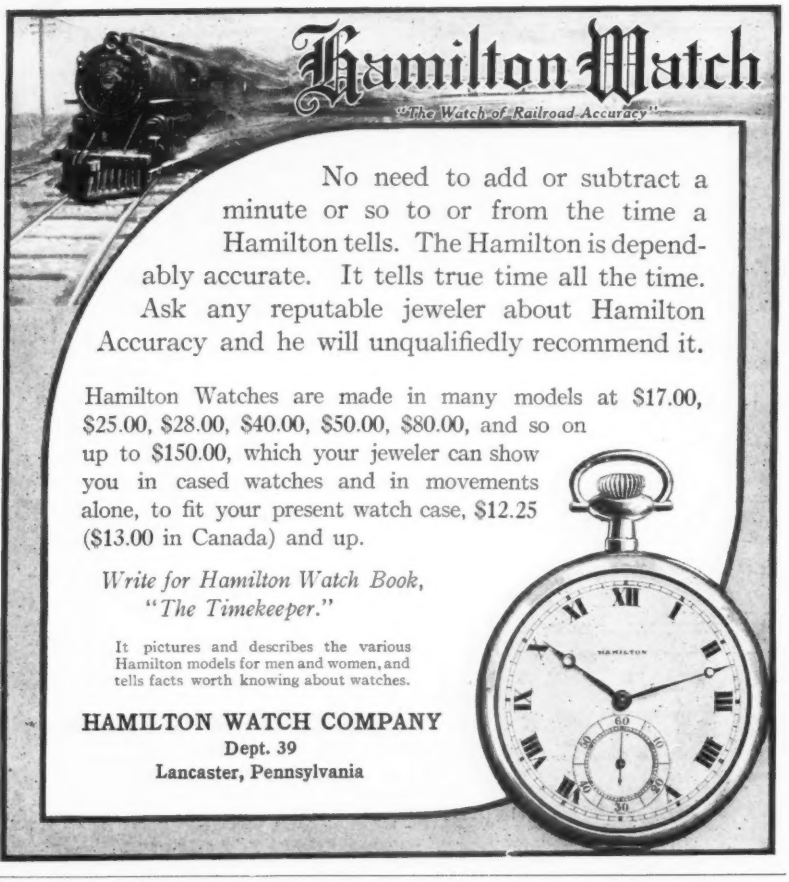
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Another Message From "TIM - BER"

"RESOLVED, That it is the duty of every lumber manufacturer to ascertain wherever possible the ultimate use of the structural timber which he sells, this applying particularly to special orders for some definite building or use, and that,

"IN EVERY CASE it is the duty of the wholesaler or the man who sells timber direct to the ultimate consumer, to ascertain the use to which it is to be put, and that,

"LUMBERMEN representing all branches of the industry should immediately take steps as above suggested, and in other ways ascertain whether the material ordered or specified is suitable for the use in view, and in all cases give assistance in the selection of grades and kinds, to the end that the consumers may receive the satisfaction and service which they obtain from other building materials."

This resolution, unanimously adopted at the annual meeting of the N. L. M. A. in Chicago, June 1, 1916, marks another forward advance by the lumber manufacturers of the United States. It means that the lumbermen recognize a definite responsibility to give the consumer standard goods that can be relied upon.

The best way for the user of wood to secure material that will give the service required is to insist that it be produced by mills which have *Association inspection* and make guaranteed grades. These are the mills which compose the organizations affiliated with

The National Lumber Manufacturers Association

CHICAGO, ILL.

Subscribing Associations are: California Redwood, California White and Sugar Pine, Georgia-Florida Sawmill, Hardwood Manufacturers of the United States, Michigan Hardwood Manufacturers, North Carolina Pine, Northern Hemlock and Hardwood Manufacturers, Northern Pine Manufacturers, Southern Cypress Manufacturers, Southern Pine, West Coast Lumbermens, Western Pine Manufacturers.



SERVICE DEPARTMENTS

The Trade Extension Department of the National Lumber Manufacturers Association offers a unique free service to Architects, Engineers, Retailers and Builders. The Blue Book of the National Lumber Manufacturers Association gives prompt and reliable credit rating and collection service. The Inter-Insurance Exchange of the National Lumber Manufacturers Association furnishes sound indemnity for losses by fire in sawmills, planing mills and lumber yards.



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Declaration of Principles and Policy of The American Forestry Association

IT IS A VOLUNTARY organization for the inculcation and spread of a forest policy on a scale adequate for our economic needs, and any person is eligible for membership.

IT IS INDEPENDENT, has no official connection with any Federal or State department or policy, and is devoted to a public service conducive to national prosperity.

IT ASSERTS THAT forestry means the propagation and care of forests for the production of timber as a crop; protection of watersheds; utilization of non-agricultural soil; use of forests for public recreation.

IT DECLARES THAT FORESTRY is of immense importance to the people; that the census of 1913 shows our forests annually supply over one and a quarter billion dollars' worth of products; employ 735,000 people; pay $367,000,000 in wages; cover 550,000,000 acres unsuited for agriculture; regulate the distribution of water; prevent erosion of lands; and are essential to the beauty of the country and the health of the nation.

IT RECOGNIZES THAT forestry is an industry limited by economic conditions; that private owners should be aided and encouraged by investigations, demonstrations, and educational work, since they cannot be expected to practice forestry at a financial loss; that Federal and State governments should undertake scientific forestry upon national and State forest reserves for the benefit of the public.

IT WILL DEVOTE its influence and educational facilities to the development of public thought and knowledge along these practical lines.

It Will Support These Policies

National and State Forests under Federal and State Ownership, administration and management respectively; adequate appropriations for their care and management; Federal coöperation with the States, especially in forest fire protection.

State Activity by acquirement of forest lands; organization for fire protection; encouragement of forest planting by communal and private owners, non-political departmentally independent forest organization, with liberal appropriations for these purposes.

Forest Fire Protection by Federal, State and fire protective agencies, and its encouragement and extension, individually and by coöperation; without adequate fire protection all other measures for forest crop production will fail.

Forest Planting by Federal and State governments and long-lived corporations and acquirement of waste lands for this purpose; and also planting by private owners, where profitable, and encouragement of natural regeneration.

Forest Taxation Reforms removing unjust burdens from owners of growing timber.

Closer Utilization in logging and manufacturing without loss to owners; aid the lumbermen in achieving this.

Cutting of Mature Timber where and as the domestic market demands it, except on areas maintained for park or scenic purposes, and compensation of forest owners for loss suffered through protection of watersheds, or on behalf of any public interest.

Equal Protection to the lumber industry and to public interests in legislation affecting private timberland operations, recognizing that lumbering is as legitimate and necessary as the forests themselves.

Classification by experts of lands best suited for farming and those best suited for forestry; and liberal national and State appropriations for this work.



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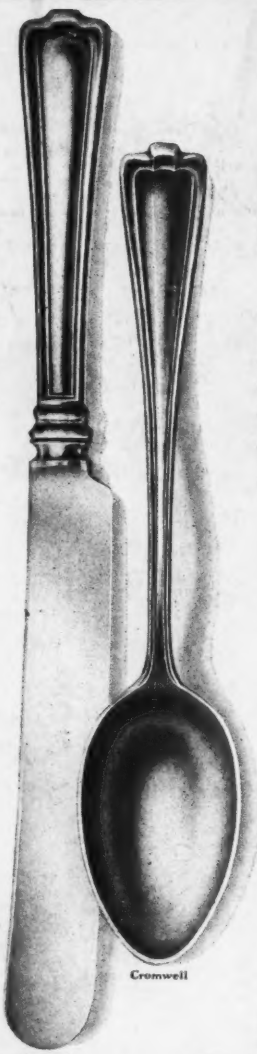
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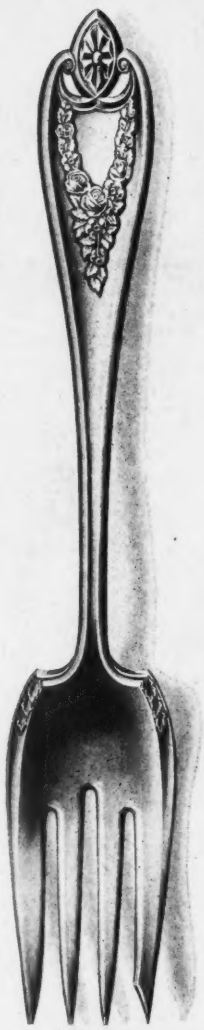
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